

ABSTRACTS



Highlights of Student Research and Creative Endeavors

Abstract

Effect of the Environment on the Development of the Child

The purpose of this study was to determine the effect of the environment on the development of the child. The study was conducted in a hospital setting and involved 100 children aged 1 to 5 years. The children were divided into two groups: a control group and an experimental group. The control group was kept in a normal environment, while the experimental group was kept in a hospital environment. The children were observed for a period of 12 months. The results of the study showed that the children in the experimental group developed more rapidly than the children in the control group. This was particularly true for the children in the experimental group who were kept in a hospital environment. The results of the study suggest that the environment has a significant effect on the development of the child.

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PRESENTED AT NATIONAL AND STATE CONFERENCES

The Effects of Math Anxiety on Mathematical Academic Success during the Freshman Year

Amanda Andrews

*Faculty Mentor:
Dr. Jennifer Brown
Teacher Education*

Math anxiety is a reoccurring problem for many students, and the effects of this anxiety on college students are increasing. The purpose of this study was to examine the association between pre-enrollment math anxiety, standardized test scores, math placement scores, and academic success during freshman math coursework (i.e., pre-algebra, college algebra, and math modeling). The researchers conducted an exploratory observational study using pre-existing data from the Freshman Orientation Survey, which contained the 9-item Abbreviated Math Anxiety Scale, and institutional research data. The sample included 180 freshmen students at a university in the southeastern United States. A series of descriptive and frequency analyses and correlational analyses were conducted. The results suggest that standardized test scores and math anxiety had a moderate, negative relationship. In addition, there were predominately negative relationships between math anxiety and final course grades, particularly for pre-algebra. This research could assist instructors and advisors to understand the effects of math anxiety on future academic success and to assist students in their college math coursework.

*Presented: 2014 Eastern Educational Research Association Annual Conference
Funded by: CSU's Student Research and Creative Endeavors Grant (SRACE)*

Indoor Air Quality Monitoring of Smoke and Smoke-free Work Places in Columbus, GA

Public Health is an inevitable and crucial part of providing a sustained healthy environment. Smoking tobacco products, particularly, has a significant effect on this delicate balance. Members of the Delta Tau chapter of Eta Sigma Gamma at Columbus State University teamed up to help the community by providing a thorough assessment of the atmosphere in public places by collecting data on harmful toxins from second-hand smoke. The students were properly trained on the TSI SidePak AM510 Personal Aerosol monitor needed and patrolled sixteen different hospitality venues in Columbus, Georgia. All of these resources combined in an effort to support Breathe Easy Columbus, which aims to implement an environment that is safe for employees and patrons. The study assessed the concentration of respirable suspended particles in the air which, according to the Surgeon General warning, are risk factors for lung cancer and heart disease in adults and several other serious problems for children.

Throughout the period of study we found several ranges of fine particles in the air. These fine particles are markers for second-hand smoke, and the EPA has a set healthy standard of 65 ug/m³ average for daily exposure. In sixteen tested sites, over a third had levels higher than deemed safe. The establishments containing the highest levels of these particles were potentially almost ten times more harmful than the standard. Assessments of the sites included awareness regarding use of informational signs, proper disposal, upkeep of the establishment, etc. The conclusion provides the urge to continue support in keeping Columbus healthy, as second-hand smoke can be incredibly toxic.

*Abigail Casey
Meagan Fountain*

*Faculty Mentor:
Dr. Tara Underwood
Health & Physical
Education and
Exercise Science*

What's On Your Plate?

*Hadiye Clinkscales
Allie Van de Voorde*

*Faculty Mentor:
Dr. Underwood
Dr. Thomas
Health & Physical
Education and
Exercise Science*

"What's on Your Plate?" is a Columbus State University peer health mentorship project with a local high school within a zip code with high rates of obesity. Two undergraduate health science students mentored a freshman high school student throughout a sixteen week course. The methods included the development and implementation of peer surveys on nutrition knowledge conducted by the high school student and a culminating research expo that educated all students from the school on survey outcomes as well as nutritional education. Specific education included distinguishing between whole bread vs. white bread, 100% juice concentrate vs. 0% juice, daily meal caloric intake, and daily water consumption. Students were able to calculate their BMI with information on height and weight. An N of 78 high school students completed the survey. Results indicate 32% of students listed soda as their primary daily beverage. Seventy-one percent of students reported eating white bread instead of whole grain bread. Fifty-eight percent of students drank less than three cups of water per day. Self-reported frequency of the type of food indicated fast food as the primary meal type. Approximately half of the students participating in the BMI activity resulted in the overweight or obese range. This project allowed the CSU students to implement a community based intervention that enhanced their own applied research experience. After completing this project, the high school students were able to meet the grade level health standards for nutrition. This combined benefit is easily replicable and beneficial both academically and personally.

*Presented: Society of Public Health Educators Annual Meeting
Funded by: CSU's Student Research and Creative Endeavors Grant (SRACE)*

An Experiment on Phenotypic Plasticity on Snail Shell Morphology: A Comparison of *Physa acuta* from either a Pond or Stream Environment

Biotic interactions seem to be the center of focus in increasing research on how predator effects seem to induce genetic polymorphism and phenotypic plasticity in order to increase species diversity. However, more research needs to focus on how abiotic factors can strongly impact species diversity through phenotypic plasticity and genetic polymorphism as well. This study focuses on genetic polymorphism and phenotypic plasticity arising from the effects of abiotic factors. In support of potential adaptation in response to a particular environment, I had to observe the physiological basis of the snail species *Physa acuta* and test the differences between shell morphology in these species through geometric morphometrics, a multivariate statistical model used to test morphological differences in general. Analyses of this contemporary model were used including TPSDIGS2, TPSutil, TPSRegr, TPSRelw and Procrustes analysis. These analyses were used on samples of the *P. acuta* from the pond ($n=36$) and *P. acuta* from the stream ($n=31$). Comparison of these snails from different areas of the same environment allowed me to observe clear differences between the physical features of the shells from each habitat. After the geometric morphometrics analyses and multivariate test from ANOVA, it expressed that the *P. acuta* from the pond had a smaller sized and thin shell compared to the *P. acuta* from the stream with its streamlined and greater sized shell due to the great impact of hydraulic pressure from the stream environment. Therefore, based on ANOVA results, there was a significance of shell variation between these sources, and the source (abiotic factor) effects on shell morphology. Although these results generally support the phenotypic plasticity and possibly the genetic polymorphism concept, some modifications may be required, possibly by increasing the number of individuals from the species *Physa acuta*. My findings and utilization of geometric morphometrics supported the concept of phenotypic plasticity.

Tatyana Foster

*Faculty Mentor:
Dr. Clifton Ruehl
Biology*

Awarded: 2nd place in the Natural Sciences at Georgia Collegiate Honors Council Annual Meeting

Presented: Georgia Collegiate Honors Council Annual Meeting

Funded by: CSU Honors Educational Activity Grant

Characterizing Critical Habitat for The Endangered Piedmont Blue Burrower Crayfish

Jess Gilmer

Faculty Mentor:
Dr. Troy A. Keller
Earth & Space Science

Global climate threatens the viability of wetlands throughout the Southeastern US. Regional climate models predict decreased precipitation and groundwater recharge which will accelerate wetland loss in the southeast. State of Georgia has been at the epicenter of these climate fluctuations having just experienced a series of devastating droughts. Meriwether County is rural area rich in natural springs and associated wetlands. Inhabiting some of these riparian wetlands is the Piedmont Blue Burrower Crayfish (*Cambarus harti*), a state-listed endangered primary burrowing crayfish. In order to protect *C. harti* from future harms, it is imperative to understand the hydrology of wetland groundwater on which this species depends. For this research groundwater fluctuation patterns were assessed at 4 *C. harti* localities (> 3 miles apart). We installed two shallow wells (~1.5m) at each site: one well installed among active *C. harti* burrows (test wells) and a second in close proximity (< 100m) where no active burrows have been observed (control wells). Solinst Leveloggers were deployed in each well to record groundwater level and temperature fluctuations every 30 minutes from June 2013 to January 2014. Groundwater co-varied between control and test wells, however groundwater levels were closer to the ground surface in test wells compared to control wells. Groundwater levels were highest during winter and lowest during late summer-early autumn. Differences in depth to groundwater between test and control wells suggest that groundwater level may dictate the extent of *C. harti* populations. Effective wetland conservation strategies need to account for how groundwater fluctuations influence subterranean obligate wetland species such as *C. harti*.

Presented: Society for Freshwater Science Annual Meeting 2013
Funded by: CSU's Student Research and Creative Endeavors Grant (SRACE)

The Effect of Topamax on the Amyloid Beta Protein of Astrocytes

Topamax, an anti-epileptic drug, has been shown to effectively reduce the number of monthly migraines in patients. Topamax blocks the voltage-dependent sodium channels and enhances GABA activity at a nonbenzodiazepine site on the GABA(A) receptor. When GABA(A) is activated by Topamax, chloride ions enter and hyperpolarize the membrane preventing an action potential. The amyloid beta protein, whose accumulation is a hallmark of Alzheimer's Disease, is directly inhibited by the activation of the GABA(A) receptor in neurons. This experiment tested the amyloid beta protein levels following Topamax treatment of mouse astrocytes in vitro. The hypothesis was that increasing Topamax concentrations would be associated with a decrease in the amyloid beta protein levels. C8-D1A astrocytes 1X610 cells/ml were treated with Topamax (0.005mg/ml, 0.01mg/ml, 0.02mg/ml, or 0.04mg/ml) for either 24 or 48 hours. An ELISA was used to determine the amyloid beta protein concentration using a spectrophotometer. A two-way ANOVA and a Tukey's post hoc test revealed that there was a significant increase in the amyloid beta protein following the highest Topamax treatment ($p=0.039$). These results differ from studies in cortical slices where an increase in GABA(A) activity results in a decrease in amyloid beta protein. This implies results are a function of cell type.

Elizabeth Lamberth

*Faculty Mentor:
Dr. Kathleen Hughes
Dr. Kenneth Smith
Biology*

Awarded: The Johnson Award at Beta Beta Beta Southeastern Region Meeting

Presented: Beta Beta Beta Southeastern Region Meeting, Tower Day

Funded by: Beta Beta Beta, CSU's Student Research and Creative Endeavors Grant (SRACE)

A Mathematical Model for Glucose-Oxygen Kinetics and Cell-Mediated Response in Prostate Cancer Cells of Type II Diabetes

Jemirian Pitts

Mathematical models offer a foundation to gain valuable insight in the development and growth of tumor-immune dynamics. We present a new mathematical model that will describe prostate tumor growth in Type II diabetic patients. Additionally, we will offer a mathematical model that will describe immune response, focusing on the role of T-lymphocytes. Finally, we will propose a model that will describe tumor-immune interactions. Each model uses a system of differential equations. Growth rates are determined, under intrinsic Glucose-Oxygen environments. The model will attempt to provide an adequate first step toward the understanding of prostate tumor dynamics influenced by type II diabetes.

Faculty Mentor:
Dr. Monica Frazier
Biology

Presented: Association of Southeaster Biologists Conference, Tower Day

Cost-Efficient 3-D Motion Capturing

One of the growing trends out there amongst new and indie developers is an increase in games utilizing 3-D models and animation. The biggest problems that come with 3-D animation is that it is traditionally a very time consuming, tedious process, and most of all, costly. More affordable alternatives such as IpiSofts' Motion capture and motion capture equipment such as the Microsoft Kinect aim to cater to the needs of smaller game developer groups and animation studios. The project aims to analyze the effectiveness of both software and hardware by using the equipment to capture an actor's motions and analyze the quality of those motions with a third party application.

*Cedric Searcy
Syedali Nabi*

*Faculty Mentor:
Dr. Charles Turnitsa
TSYS School of
Computer Science*

Presented: Georgia Undergraduate Research Conference, Tower Day

Funded by: CSU's Student Research and Creative Endeavors Grant (SRACE), CSU Department Funds

The Effects of Curcumin on the Expression of p53 and Bcl-2 Proteins in the Human Breast Carcinoma Cell Line MDA-MB 468

Angelin Shajan

*Faculty Mentor:
Dr. Monica Frazier
Biology*

Introduction: Anti-cancer efficacy of curcumin has been tested in pre-clinical studies that have reported promising results in curcumin's ability to inhibit human cancer cell proliferation and tumorigenesis (Nagaraju et al., 2012). The purpose of this experiment was to explore the anti-proliferative and apoptotic effects of curcumin on breast cancer cells. We also wanted to evaluate the effects of curcumin on the expression of p53 tumor suppressor and Bcl-2 anti-apoptotic proteins, as well as marker proteins calretinin and cytokeratin in the MDA-MB 468 breast cancer cells. Until recently, calretinin and cytokeratin have been used only as diagnostic tumor markers. However, recent studies show that they may play a role in apoptosis, viability and cell growth (Schwaller & Blum, 2013 and Karantza, 2011). We predict a dose-dependent increase in p53 expression, and a dose-dependent decrease in Bcl-2, calretinin and cytokeratin expression, viability and proliferation after the curcumin treatment.

Methods: Cell proliferation, viability and immunocytochemistry assays were performed on the MDA-MB-468 cells. Briefly, cells were treated with 0, 25, 50 and 100 μM curcumin for 24 hrs. After treatment, cells were either stained with Trypan blue and counted (Cell proliferation and viability assay) or fixed and processed for labeling by DAB staining.

Results: Our data suggested that curcumin caused a dose-dependent decrease in the viability of MDA-MB 468 cells at 50 μM and 100 μM . However, there was no decrease in viability at 25 μM curcumin. Results also suggested a dose-dependent increase in proliferation of the cells treated with 25 μM and 50 μM curcumin. However, there was no difference in proliferation rates between the 100 μM and the control group. Whereas there was no change in the expression of cytokeratin 5/6 or 20 upon treatment with curcumin, there was a dose-dependent increase in calretinin expression at 25 μM and 50 μM curcumin. Data for p53 and Bcl-2 are ongoing. Upon further statistical analyses, we hope to confirm the significance of these results.

Conclusions: Cells treated with 25 μM of curcumin for 24 hours did not make any contributions towards a decrease cell viability or growth. Only cells treated with 100 μM curcumin showed both a decrease in viability and proliferation. Surprisingly, an increase in calretinin was noted following treatment which could suggest a possible role as a new target for therapy. However, more research is needed.

Awarded: Best Poster at Georgia Undergraduate Research Conference
Presented: Georgia Collegiate Honors Council Annual Meeting, Southern Regional Honors Council Conference

Abundance and distribution of microplankton in the San Francisco Estuary

Microplankton are a diverse group of planktonic organisms ranging from 0.02 to 0.2 millimeters. Since the group is defined solely by size, it spans numerous taxonomic groups, including both heterotrophs and autotrophs. Microplankton are abundant in all aquatic ecosystems and are important prey for many organism, including bivalves, crustaceans, and fish. Little is known about the microplankton community in the San Francisco Estuary, and information on their abundance and distribution will help scientists better understand their role in local foodwebs. This research quantified the abundance and distribution of microplankton in the San Francisco Estuary from 2010 to 2012. Microplankton were collected from the Sacramento and San Joaquin Rivers and preserved with iodine. They were then identified, measured, and counted on an inverted microscope. Over small spatial scales (~30 km), microplankton abundance (number per liter) varied significantly; however, the composition of the microplankton assemblage did not. Microplankton abundance in the Sacramento River was dominated by diatoms, and total abundance did not vary significantly. Microplankton abundance in the San Joaquin River was dominated by cyanobacteria, and total abundance was extremely variable. As a result, the Sacramento River might provide a more stable food source for higher trophic levels, including crustaceans and fish.

Carrie Ann Sharitt

*Faculty Mentor:
Dr. Lindsay Sullivan,
Romberg Tiburon
Center for
Environmental Studies*

Awarded: Best Poster at Tower Day

Presented: STEM Teacher and Researcher Symposium, Southeast Regional Noyce Conference, National Science Teachers Association Conference, Tower Day

Funded by: STEM Teacher and Researcher Program led by California Polytechnic State University

The Harvest is Plenty: A Faith Based Health Assessment

Shardá Short

*Faculty Mentor:
Dr. Joy Thomas
Health & Physical
Education and
Exercise Science*

Health and wellness are significant components of the world's religions. Forming and educating health ministries provides the foundation for expanding the health and wellness of members. Promotion of healthy living is imperative to churches in need of knowledge and guidance. Live Healthy in Faith is an initiative that brings congregations together to promote health. The overall goal of this project is to eliminate health disparities in the faith community surrounding Columbus, Georgia. With funding from the Georgia Department of Public Health, the program utilizes the Centers for Disease Control (CDC) Change Tool Assessment to guide policy and environmental changes within local churches. This assessment allows church leaders to see exactly what areas need improvement. Live Healthy in Faith provides training and community resources to help faith organizations to eliminate health disparities. The Change Tool Assessment emphasizes the attention needed for sustainable change.

Presented: Georgia Undergraduate Research Conference,
Society of Public Health Education Annual Meeting, Tower Day

Funded by: CSU's Student Research and Creative Endeavors Grant (SRACE), Harvest is Plenty,
Eta Sigma Gamma, Live Healthy Columbus Coalition

Documenting the Sandhill Flora of Central Georgia using DNA Barcodes

DNA barcode libraries are fast becoming incorporated into the restoration and conservation management plans of local floras, especially where taxonomic complexity can confound plant identification based on morphology alone. Based on a combination of high sequence quality and high species discrimination success, the Consortium for the Barcode of Life (CBOL) has recently adopted the *rbcl*+*matk* gene region of the chloroplast genome as the core Barcode for plants. This study represents a preliminary evaluation of the potential use of this barcode to establish a genetic library for the Sandhill Flora of Georgia, a fragile and threatened habitat of moderate phylogenetic dispersion that holds a large number of rare and endangered plant species. To assess DNA sequence variation for this barcode region, DNA and Herbarium vouchers were collected for ~200 species (99 genera, 72 families) across a series of 11 wetland habitats near Fort Benning, Georgia. To conduct an initial evaluation of % sequence recovery and % species resolution for this flora using this barcode region, forward and reverse sequencing was conducted on a subset of taxa for the *rbcl*-portion of the plant DNA barcode. Sequence recovery was relatively high and comparable with studies of similar taxonomic composition. Species resolution (62%) was relatively low, but expected, for a flora with a relatively high composition of polytypic genera (49%). This study underscores the potential utility of establishing a barcode library of the Sandhill region of Southwest Georgia for future ecological, conservation, and restoration applications.

Scott Silvis

Faculty Mentor:
Dr. Kevin Burgess
Dr. Julie Ballenger
Biology

Awarded: Third Place Poster at Georgia Undergraduate Research Conference

Presented: Georgia Undergraduate Research Conference, Tower Day

Funded by: CSU's Student Research and Creative Endeavors Grant (SRACE), CSU Department Funds

Confirmation of Herbal Medicines using Plant DNA Barcoding

Samantha Worthy

*Faculty Mentor:
Dr. Kevin Burgess
Biology*

Medicinal plants are a precious part of the world's flora. More than 80,000 species out of the 250,000 higher plants on Earth are reported to have at least some medicinal value and around 5,000 species have specific therapeutic value. Plants have been used for thousands of years as remedies to cure the sick and now a growing number of Americans are turning to naturopathic medicines because of their low cost and decreased side effects. Naturopathic medicines have been shown to prevent DNA mutation, decrease tumor formation, reverse the process of carcinogenesis and even inhibit cancerous cell growth. Recently, a number of studies have shown that DNA barcoding is an effective technique for product verification of naturopathic medicines. The goal of my research is to employ the use of DNA barcodes as a tool for the genetic confirmation of naturopathic plants. Specifically, my objectives are 1) to extract DNA from ~ 50 manufactured naturopathic medicines, 2) sequence the *rbcl* barcode gene region of the chloroplast genome for each and, 3) verify their genetic identity to manufacturer labels. The use of DNA barcodes has proven to be an effective technique for obtaining high quality genetic sequences for ~ 30% of the samples tested and has revealed discrepancies between the manufacturer's labeling and true genetic identity. This research underscores the potential broader use of DNA barcodes to assess the quality of naturopathic medicines.

Presented: Georgia Collegiate Honors Council Annual Meeting, Tower Day

*Funded by: CSU's Student Research and Creative Endeavors Grant (SRACE), CSU Department Funds,
Flora Clark Award, Beta Beta Beta*

STUDY PROJECTS

Study Abroad and International Education Initiatives

The purpose of the study abroad program is to provide students with a unique opportunity to gain a deeper understanding of the world and its cultures. The program is designed to be a transformative experience that challenges students to step out of their comfort zones and embrace new perspectives. Students will have the chance to immerse themselves in a foreign environment, where they can learn from the experiences of others and develop a global mindset. The program is open to students from all backgrounds and disciplines, and it offers a variety of options to suit different interests and needs. Whether students choose to study abroad for a semester, a year, or through a short-term exchange program, they will benefit from the rich cultural and academic experiences that await them. The program is supported by a dedicated staff of advisors who provide guidance and support throughout the process, ensuring that students have a smooth and successful experience. The ultimate goal of the program is to foster a sense of global citizenship and to prepare students to thrive in an increasingly interconnected world.

Study Abroad
and International
Education Initiatives

Study Abroad
and International
Education Initiatives

Study Abroad and
International Education
Initiatives

FUNDED PROJECTS

Study Abroad India: Chemistry and Industry: Field visit to Merck Millipore, Limited

*Melita Boykin
Erin Anderson*

*Faculty Mentor:
Dr. Anil Banerjee
Chemistry*

The purpose of our poster presentation is to discuss our site visit to Merck Millipore. More specifically we will elaborate on our hands-on experiment in DNA isolation from plasmid and set-up of a PCR, checking results using Agarose Gel Electrophoresis. Merck Millipore started as Bangalore Genei Pvt. Ltd. in 1989 and went through a series of changes until acquired by Merck KGaA, Germany in 2009 and certified as Merck Millipore in 2010. This multi-million dollar site is India's premier Bioscience manufacturing company, specializing in the advancement of technologies and cutting-edge tools for the development and manufacture of new drugs as well as improving productivity in laboratories. The company's portfolio includes an array of tools for genomic and proteomic research, educational products and tech-ware products. Polymerase Chain Reaction (PCR) enzymes and reagents are some of Merck's primary products for genomic research that have many practical uses. Medical applications of PCR include prenatal testing as well as genetic testing for mutation, and infectious disease (e.g., HIV) testing; forensic applications include genetic fingerprinting and prenatal testing. Our site visit to Merck Millipore included a hands-on experiment in DNA isolation from plasmid and set-up of a PCR, checking results using Agarose Gel Electrophoresis.

Presented: Tower Day

Funded by: CSU Department Funds, American Chemical Society Auburn Local Section

Assessing species composition in herbal teas

DNA barcoding involves species identification. Animal barcoding involves barcoding the mitochondrial region Co I whereas plant barcoding requires the use of the rbcL gene region of chloroplast genome because CO1 in plants shows little variation among species. Recently each of the gene regions have proven effective for the identification unknown samples and the monitoring of products currently being used in the food and medicinal industry. The focus of this research involves product verification of teas utilizing DNA barcodes. Here a variety of teas will be sampled to ensure product labeling matches their contents, where product substitution has been shown in previous studies.

Alyse Bryant

*Faculty Mentor:
Dr. Kevin Burgess
Biology*

Presented: Tower Day

Funded by: CSU's Student Research and Creative Endeavors Grant (SRACE), CSU Department Funds

The Birth of Modern Gastronomy during the Italian Renaissance

Caroline Campbell

Faculty Mentor:
Dr. Susan Hrach
English

Along with the intellectual and cultural advances of the Italian Renaissance, a new birth of culinary practices occurred that similarly shaped our modern world. The changes in gastronomic practices reflect the overall changes in society; while philosophers attempted to understand humanity's place in the universe, Renaissance chefs attempted to better sustain human life and wellness through their craft. Increased abundance of food and resources following the Black Death along with the introduction of new foods in Renaissance-era trading provided sources for experimentation, resulting in creations such as pizza and gelato (Capatti and Mantanari 41-61). Furthermore, Renaissance era chefs and physicians alike investigated food for a higher purpose: its medicinal properties, as both meals and health remedies were created in the kitchen (Palma 38). The increased accessibility of paper, which facilitated many advancements of the Renaissance, similarly enabled the communication of recipes through cookbooks and personal correspondence. One of the first cookbooks, Platina's *On Right Pleasure and Good Health* reflects in its title and contents the shifting attitude towards food as a source to promote both pleasure and health. Additionally, table etiquette and eating rituals further developed: for example, initial widespread use of the modern fork occurred during the Renaissance (Capatti and Mantanari 53). The changing view of food during the Italian Renaissance inspired gastronomic progressions that characterize modern culinary practices.

Awarded: Best Presentation at Tower Day

Presented: Tower Day

Funded by: CSU Honors Educational Activity Grant, CSU Department Funds

Academic Enrichment Through Solar Astronomy

Every semester, the NASA Space Grant Scholarship provides a small group of students the opportunity to be involved in Solar astronomy research at the MeadWestvaco Observatory, located in the Coca-Cola Space Science Center. This work involves extensive imaging to monitor solar activity. Over the past year, the MWVO has undergone a massive renovation, both on and offline, facilitated by a grant provided by the Institute of Museum and Library Services. The MWVO has added a Planewave Instruments CDK24 0.61m telescope and several specialized solar telescopes. It is also debuting a brand new observatory website, which is used as one of a number of new academic enrichment resources at the disposal of the CCSSC. The best Solar images taken by Space Grant interns since the beginning of the program are stored in easily accessible galleries, and live webcast views from the telescope and other instruments can be seen from this webpage. In addition, K-12 educators can use the website to access the Real time Interactive Solar Observatory, a tool which allows any classroom in the world to function as a solar Observatory.

This poster will present information about the Sun, the equipment used by Space Grant interns, and the MWVO website, all in the context of the academic enrichment applications of the Space Grant program.

*Nicholas Carpenter
James Samford
Cameron McCarty
Austin Caughey
Johnny Brown*

*Faculty Mentor:
Dr. Rosa Williams
Earth & Space Science*

Presented: Tower Day

Funded by: NASA Georgia Space Grant

What is Brooksella?

*Buffy Cook
Kayla Griffin*

*Faculty Mentor:
Dr. David Schwimmer
Earth & Space Science*

During the fall 2013 semester, a pilot study was initiated to determine nature of unusual siliceous concretions, called "Brooksella." These were collected from the Cambrian-age Conasauga Formation in Northwest Georgia. "Brooksella" has been a subject of paleontological controversy for over 100 years, and their identity has been variously assigned to sponges, jellyfish, trace fossils, and unique life forms now extinct. Samples were cut to form thin sections and were observed through phase-contrast illumination at high magnification. The immediate results presented possible spicules, which suggest sponges, and clustered spheres and elongate cellular objects, which suggest algae. Some of the possible algal specimens have been sent off to an algal specialist and results are pending.

Presented: Tower Day

Funded by: CSU Student Research and Creative Endeavors Grant (SRACE), CSU Department Funds

Understanding Parallel Processing for the Undergraduate

Parallel processing is at the core of high-end computing, where multiple processes and/or threads are executed simultaneously on multiple CPU cores. It can be an extremely challenging concept for undergraduate students to understand. Due to its prevalence and growing necessity, an understanding of the parallelism concept is required for most, if not all, Computer Science students. However, given its complexity, how and when is it best to introduce undergraduate students to this concept? At Columbus State University, CS students are taught parallelism in the C language within the scope of a course on Computer Operating Systems. While C is a very common language, it is not taught at CSU and oftentimes students do not understand the syntax well enough to implement the concept. This project aims to find the optimum time and practical way to introduce parallelism to CS undergraduates by comparing implementations of simple, multi-threaded programs in various computer programming languages, particularly focusing on C, C#, Java, and Erlang.

Brandon Cooper

*Faculty Mentor:
Dr. Angkul
Kongmunvattana
TSYS School of
Computer Science*

Presented: Tower Day

Funded by: CSU Department Funds

The Effect of Endogenous Postmenopausal Hormones on Astrocyte Viability

Tiffany Butterfield

Faculty Mentor:
Dr. Kathleen Hughes
Dr. Monica Frazier
Biology

In postmenopausal women, the ovaries continue to excrete steroid hormones for up to ten years following menopause. These hormones play an important role in the human body and their deficiency can be related to a number of health problems, more specifically neurodegenerative diseases like Alzheimer's disease. The goal of this study is to determine the neuroprotective effects of the postmenopausal steroid hormones: estrone, 17 α -estradiol, progesterone, and testosterone, alone and combined, on astrocyte viability under oxidative stress in vitro. We predict that 17- α estradiol, and progesterone, will improve astrocyte viability under oxidative stress. We further predict that testosterone will have no effect on astrocyte viability under oxidative stress. Mouse cerebellum astrocytes will be split into two groups, healthy and unhealthy. Groups will then be pre-treated for twenty-four hours at various concentrations of estrone, 17- α estradiol, testosterone, progesterone, and a combination of all. The astrocytes labelled unhealthy will then be exposed to hydrogen peroxide for one hour and both groups will be re-treated with the hormone mixtures for an additional twenty-four hours. Cell viability will be recorded on both groups using the MTT cell proliferation assay. To determine if the hormones display neuroprotective properties, statistical analysis will be performed using a two-way Analysis of Variance (ANOVA) and Tukey's post hoc.

Presented by: Tower Day

Funded by: CSU Student Research and Creative Endeavors Grant (SRACE)

Effects of Metformin on the Spread of Breast Cancer Cells

Cancer is a disease in the body that causes cells to change and grow out of control. Breast cancer is one of the leading causes of cancer death among women around the world. Breast cancer is diagnosed and treated based on stage and severity of the disease. If there is a way to keep the cancer cells from spreading, metastasizing, this would make treatment much easier. Previous studies have shown that high blood sugar will accelerate the growth of cancer cells. We hypothesize that the effects of Metformin, a drug commonly known for its ability to control blood sugar, will stop or slow the proliferation of breast cancer cells via the glycolytic pathway. This experiment will be performed by treating the cancer cells, MDA-MB-468, and normal cells, Hs 578 Bst, with metformin. From this point, we will observe and measure the proliferation of cells using the Bio-Rad cell counter. This study will also investigate if Metformin can inhibit the invasive movement of cells using microscopy. Results are pending.

*John Fredrick
Jacob Taylor Clay
Holly Mullis*

*Faculty Mentor:
Dr. Monica Frazier
Biology*

*Awarded: Best Poster at Tower Day
Presented: Tower Day
Funded by: CSU Department Funds*

Determining the Level of Carotenoids in Herbivorous Grasshoppers As Food for Insectivorous Birds

Caitlin Gallagher

Carotenoids are biologically active pigments that are synthesized by plants, fungi, bacteria and algae, and are an important dietary requirement of all animals, including birds. In animals, carotenoids help to reduce the free radicals produced by normal metabolic processes and external exposure to ultraviolet light and air pollutants. Without carotenoids, free radicals can damage DNA and denature proteins. Birds also use carotenoids for species identification, mate selection and other forms of non-vocal communication. Herbivorous insects, like grasshoppers, are likely an important source of these critical carotenoid pigments for insectivorous birds. In this experiment, I measured the carotenoid content in herbivorous grasshoppers, which are consumed by many species of birds. I freeze-dried and crushed the grasshoppers, extracted the carotenoids using acetone, and identified the carotenoids using high-performance liquid chromatography to determine if grasshoppers are indeed a good source of carotenoids for birds.

Faculty Mentor:
Dr. Jennifer Newbrey
Biology

Presented: Tower Day

Funded by: CSU Student Research and Creative Endeavors Grant (SRACE)

The Effects of Maltose on *Staphylococcus aureus*

Glucose is a major monosaccharide needed for the progression of glycolysis. Glycolysis is a metabolic pathway in which enzymes catalyze the conversion of glucose into pyruvate and ATP molecules for energy. Glucokinase (GK) is the first enzyme utilized. It converts glucose molecules into glucose 6-phosphate. The final step of glycolysis involves pyruvate kinase (PK) converting the intermediate phosphoenolpyruvate (PEP) into pyruvate. Maltose is a disaccharide composed of two glucose molecules bonded together. *Staphylococcus aureus* is widely used as a model organism in the fields of cellular and molecular biology. We hypothesized that *S. aureus* will be able to metabolize maltose by converting it into glucose molecules and proceeding with glycolysis. The *S. aureus* cultures were treated with 0%, 5% and 10% concentrations of maltose. Following treatments, DNA was isolated followed by PCR using primers against both GK and PK. PCR results were analyzed through gel electrophoresis. Our results showed that *S. aureus* was able to metabolize maltose at 0% and 5% concentrations, but not able to metabolize maltose at 10%. Neither the first step of glycolysis which utilizes GK, nor the final step which utilizes PK were indicated in our results at the 10% maltose concentration which means that maltose was not utilized at all in the glycolytic pathway. Sugars are often used as food preservatives which inhibit the growth of bacteria to prevent spoilage. The sugars inhibit the growth of bacteria by causing changes in osmotic pressure both inside and outside of the cell, reducing the ability of cells to take up the necessary amount of water needed. This issue may be two-fold with maltose, which requires water for hydrolysis to break the molecule down into two glucose molecules. Further studies to determine the exact threshold concentration at which sugars, such as maltose, become detrimental to *S. aureus* metabolism would be advantageous.

*Michael Garen
Cale Morgan*

*Faculty Mentor:
Dr. Monica Frazier
Biology*

Presented: Tower Day

Funded by: Faculty Development Mini-grant awarded to Dr. Monica Frazier from the College of Letters and Science and the University System of Georgia STEM II Initiative

Applications of Chemistry Research as a means to contribute to Industrial Processes

*John Gary
Neill Hatcher*

*Faculty Mentor:
Dr. Anil Banerjee
Chemistry*

The Poornaprajna Institute of Scientific Research (PPISR) in Bangalore, India is actively promoting research in chemical and biological sciences, focusing on theoretical and practical applications of material science such as zeolite formation and catalytic processes. This poster presentation explores how research and integration of certain scientific fields have positioned PPISR as a critical juncture between education and industry. We will display; (1) formulation and microscale production of zeolite catalysts as efficient methods for development of industrial purposes, (2) Quality control at multiple stages using Fourier Transform Infrared Spectroscopy (FTIR), Powder X-ray Diffractometer (PXRD), Ultra Violet-Visible Spectrometers (UV-Vis), and Atomic Absorption Spectroscopy in order to ensure physical and chemical properties, and (3) PPISR's collaboration with educational institutions as well as industrial corporations in order to improve quality and capacity of current and future research. These endeavors have allowed PPISR to continue expanding and branch into other fields of research such as biological sciences, with a focus on bacteria cell culture and protein structure analysis, as well as theoretical and practical physics. During the tour, we also got an hands-on learning experience on how to analyze and interpret a powdered sample of a catalyst by a Powder X-ray Diffractometer.

Presented: Tower Day

*Funded by: CSU Honors Educational Activity Grant, CSU Department Funds,
American Chemical Society Auburn Local Section*

Study Abroad India: Chemistry and Industry: Field visit to Indo-American Hybrid Seeds

Flower color is a biological factor that is taken for granted by individuals around the world. However, it is a main focus at Indo-American Hybrid Seeds (IAHS). IAHS is an Indian based company that focuses on the manufacture and sale of vegetable and flower seeds. A recent visit to this company, their labs and their greenhouses spiked an interest in us- an interest that focuses on the reasoning for the wide variation in the color of flowers. Flower color is caused by the presence of carotenoids and flavonoids in a flower's petals—with anthocyanin being the major source of blue, red and purple. Anthocyanin is a type of flavonoid that is synthesized by a complex biological pathway known as the phenylpropanoid pathway. Color diversity attributed to anthocyanin can be caused by varying the flower's internal pH and by the presence of other pigments. The purpose of flower coloring—and therefore the purpose of anthocyanin—is to attract pollinators such as bees and other insects. This research focuses on anthocyanin synthesis, variation and purpose.

*Kameron Griffin
Kasey Rice*

*Faculty Mentor:
Dr. Anil Banerjee
Chemistry*

Presented: Tower Day

Funded by: CSU Department Funds, American Chemical Society Auburn Local Section

Effect of pH Levels on Lactate Dehydrogenase A in Breast Cancer Cells

*A'Briel Jones
Lauren Savage*

*Faculty Mentor:
Dr. Monica Frazier
Biology*

There are many factors which contribute to drug resistance and growth of tumor cells in the body. In recent research, researchers have found that different pH levels cause autophagy, a non-apoptosis process in which a cell can break down its own components resulting in cellular arrest or death or inhibition of cell growth. Other research says that changes in pH causes an increase in cancer cell growth. Activities of certain metabolic enzymes, like lactate dehydrogenase, have been linked with autophagy in certain regulatory pathways. We believe that if we expose breast cancer cells to low and high pH levels that the amounts of lactate dehydrogenase will change and that this will in turn affect the growth rate/death rate of these cells. In the study, MDA-MB-468 breast cancer cells were cultured in media at pH levels 4, 7 and 10. Cells were then counted using a cell counter to measure their growth and death under these pH conditions. Our results show the average of proliferation (cell growth) was high for cells grown at a pH level of 4. In addition, proliferation of cells treated at the pH level of 10 and 7 (normal pH) was at the highest and lowest levels, respectively. The percentage of living cells was highest for pH level of 10 with pH 7 following closely behind. Cells grown at the pH level of 4 had the lowest percentage of living cells. which was not expected, due to cells not living in very basic environments. The purpose of basic environments with pH levels of 10, like Clorox solution, is to cause cell death which would in turn result in a lower percentage of living cells or no living cells. Overall, cells grown in the acidic environments grew quickly but died at a faster rate.

Presented: Tower Day

Funded by: Faculty Development Mini-grant awarded to Dr. Monica Frazier from the College of Letters and Science and the University System of Georgia STEM II Initiative

Artificial Color Influences on Taste Expectations

The present study involved two experiments to determine if altering the color of three liquid samples would influence participants' taste enjoyment and expectations. In both experiments, all participants tasted all three flavors (sour, sweet, and neutral). In experiment 1, participants were assigned quasi-randomly to drink blue or yellow liquid samples. In experiment 2, a third (clear) color group was included. All participants reported their expectations and reactions to the liquid samples on a 10-item survey. In experiment 1, sour was the most the expected flavor choice for those who drank yellow liquids and sweet was the most expected flavor choice for those who drank blue liquids. Enjoyment ratings in experiment 1 were highest for the sweet and sour flavors, regardless of liquid color, which was unexpected. Findings from experiment 2 help explain the enjoyment of sour flavor reported in experiment 1. These experiments provide further evidence of the role of visual cues, such as color, in our taste perceptions.

Stephanie Jones

*Faculty Mentor:
Dr. Stephanie da Silva
Psychology*

Presented: Tower Day

Funded by: CSU's Student Research and Creative Endeavors Grant (SRACE), CSU Department Funds

Study Abroad India: Chemistry and Industry: Field visit to Biocon Limited

*Jennifer Klein
Rubicelys
Torres Guzman*

*Faculty Mentor:
Dr. Anil Banerjee
Chemistry*

Biocon was founded on November 29, 1978 and was the first Indian company to manufacture and export enzymes to the USA and Europe. Throughout the years it has evolved into one of the largest biopharmaceutical companies. This innovative biopharmaceutical company was the first to develop human insulin on a *Pichia* expression system. This method has proven to be inexpensive for resource poor countries and has significantly increased the efficiency of insulin manufacturing. In 2004, Biocon announced the launch of INSUGEN®, the new generation bio-insulin, manufactured in Asia's largest human insulin plant. Later on, Biocon launched various types of insulin worldwide. Today, Biocon focuses on delivering affordable medicine and developing an insulin molecule capable of oral delivery. Our visit included a tour of the formulation and fill-finish facility.

Presented: Tower Day

Funded by: CSU Department Funds, American Chemical Society Auburn Local Section

The Effect of Vitamin C on Breast Cancer Cell Proliferation

Cancer plays a large and often devastating role in many people's lives. Almost everyone knows someone who has battled or is battling cancer. The search for "the cure" has been long going and extremely tedious, as well as exciting and devastating. With science constantly changing, a cure will undoubtedly be found. However, until then, what can be done to slow down growth of cancer cells? One of the current ideas is to simply ingest a consistent dose of vitamin C. We hypothesize that vitamin C will slow down the proliferation of cancer cells by altering cellular metabolism. In this study, MDA-MB-4678 cancerous breast cells were grown in the presence and absence of 0.025% vitamin C. The rate of cell proliferation across these environments was compared. The data recorded in this experiment was analyzed using a 1-way ANOVA. Our results show that breast cancer cells treated with vitamin C had an earlier onset of proliferation than untreated breast cancer cells. However, due to the variability in numbers, the average difference in the rates of proliferation was not great enough to show a significant difference (1-way ANOVA, $F_{1,40}=0.434$, $P=0.514$). Further studies are needed to confirm the findings of this research.

Anika McIntyre
Amanda Nivens

Faculty Mentor:
Dr. Monica Frazier
Biology

Awarded: Best Poster at Tower Day

Presented: Tower Day

Funded by: Faculty Development Mini-grant awarded to Dr. Monica Frazier from the College of Letters and Science and the University System of Georgia STEM II Initiative

Affordable 3D motion capturing

*Syedali Nabi
Cedric Searcy*

*Faculty Mentor:
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Computer Science*

One of the biggest problems that come with 3d animation is that it is traditionally a very time consuming and tedious process. An animator would have to spend more time in storyboarding, reposing the character, key framing, and adjusting nuances than the amount of time motion capture would take. Motion Capture or "Mocap" is the process of recording of the movement of object or people. Motion capture only requires an actor and a depth information camera, and the movements are saved in a mocap file that can be used for analysis or rapid character animation. AAA studios such as Rockstar games make use of motion capturing equipment to streamline the animation process and shorten the time spent on production. However, the costs for accurate motion capturing software and equipment are around thousands of dollars. Smaller game developers and animators do not have the budget or resources to acquire such equipment. More affordable alternatives such as ipisoft Motion capture and motion capture equipment such as the Microsoft Kinect aims to cater to the needs of smaller game developer groups and animation studios. IpiSoft motion capture studio costs approximately under \$1000 and Microsoft Kinects can be acquired for less than \$100. Compared this to a professional setup created by OptiTrack where the minimum equipment and software that cost runs at least \$7,000(OptiTrack). It is of these qualities that this software and equipment have been selected for research in affordable motion capturing.

Funded by: CSU's Student Research and Creative Endeavors Grant (SRACE)

Effect of Metformin and HFCS-90 on the Proliferation of Cancer Cells

Emerging evidence suggests metformin, the common drug treatment for patients with type 2 diabetes, possesses anticancer properties as well as help obese patients lose weight. It does this by inhibiting the function of hexokinase (HK), the first enzyme in the glycolytic pathway. This inhibition results in lowering the amount of glucose absorbed and produced by the liver, increasing the body's response to insulin and reduces body fat percentage. The enzyme phosphofructokinase (PFK) is the second enzyme in the glycolytic pathway and converts Fructose-6-P into Fructose Bisphosphate.

High fructose corn syrup, HFCS-90 (90% fructose and 10% glucose), also called glucose-fructose is a sweetener used to sweeten food, drinks, and processed "light" foods. In this study, MDA-MB-468 breast cancer cells were either untreated or treated with 12mg HFCS-90 for four days and/or 0.05mM Metformin for two days. We hypothesized that cells treated with HFCS-90 only will proliferate at an abnormally high level compared to untreated cells. In addition, we predict that treating cells with 0.05mM Metformin will reduce the presence of PFK because the amount of fructose absorbed will be lowered. Therefore, cells treated with both HFCS-90 and metformin will proliferate at a level similar to untreated cells. In this study, proliferation was measured with a cell counter. The results were analyzed using 1-Way ANOVA and correlation graph. Although untreated and HFCS-90 treated cells all were greater in number and viability than metformin treated cells, statistical analyses of the effects of HFCS-90 and metformin on cell growth and viability at the conclusion of the experiment, Day 4, were not significant, $F_{3,12}=0.028$, $n=12$, $P=0.993$ and $F_{3,12}=2.270$, $n=12$, $P=0.133$, respectively. However, it was surprising to see that cells treated with metformin had less overgrowth or clumping in comparison to untreated and HFCS-90 only treated cells. These cells also seemed to change to a more normal phenotype. These data suggest that metformin does possess some anticancer properties and further studies are needed.

*Renata Paiva
Sarah Miller
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*Faculty Mentor:
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Biology*

Awarded: Best Poster at Tower Day

Presented: Tower Day

Funded by: Faculty Development Mini-grant awarded to Dr. Monica Frazier from the College of Letters and Science and the University System of Georgia STEM II Initiative

Music Therapy as a Nursing Intervention for Relieving Stress and Anxiety in Hospitalized Patients

*Melissa Rodgers
Amanda Walker
Carmen LeVally
Samantha Beland
Brianna James
Zohelen Chavarria*

*Faculty Mentor:
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School of Nursing*

Stress and anxiety are common manifestations that can occur as a result of a hospital stay. This stress and anxiety is exhibited through physiological factors, including increased blood pressure, respirations, and heart rate- all of which have negative effects on the body as it is trying to heal. This paper proposes utilizing Kurt Lewin's change theory to examine and change current practices to include the evidence-based practice of using music therapy as a holistic treatment for patients exhibiting signs of stress and anxiety. Many routes exist for implementing music therapy, however, we have chosen to focus on the simplest and most inexpensive measure. By purchasing MP3 players the hospital can easily implement the change and save money. We created a guideline for the hospital to use to easily implement music therapy in any clinical setting. The guideline outlines ways to assess, plan, implement and evaluate the results of the music therapy for each patient. Additionally, we recommend that staff participate in a class on music therapy implementation followed by continuing education modules annually. This manuscript compiles information from several peer-reviewed nursing articles. The research indicates the benefits of music therapy to include a reduction in anxiety and stress, improvements in heart rate, respiration and blood pressure, as well as decreased overall hospital stays; all of which positively impact a patient's recovery.

*Presented: Tower Day
Funded by: CSU Department Funds*

Progress toward the Synthesis of Monastrol Derivatives as Potential Anti-Cancer Agents

The efficacy of a pharmacologic compound is determined by efficient transport to the target site. Consequently, the use of carbohydrates as markers was introduced to induce recognition by specific receptors present on the surface of cell membranes. These carbohydrate-drug structures enhance the chance of a drug being recognized by a particular receptor and targeting cells. Our research objective is to synthesize glycosyl monastrol. Although monastrol does not target microtubules, there are still limitations. We postulate that monastrol drug uptake can be enhanced by linkage to a glucose molecule. Once transported into the cell, the drug-carbohydrate moiety would be hydrolyzed to a sugar phosphate and the active anticancer agent at its intracellular target. The concentration of the drug would be greater than that of the unconjugated drug via passive transport. The outcome of this research may aid in cellular targeting in tumor and cancer cells; thereby decreasing the side effects associated with high dosages.

*Chelsea Severin
Timothy Summers*

*Faculty Mentor:
Dr. Kenneth Smith
Chemistry*

Presented: Tower Day

Funded by: CSU's Student Research and Creative Endeavors Grant (SRACE), CSU Department Funds

Determining the glass transition temperature of polystyrene nanospheres in an aqueous matrix via fluorescence spectroscopy

Nicole Sikes

Faculty Mentor:
Dr. D. Wade Holley
Chemistry

The temperature at which a polymer undergoes transition from the rubbery state to the glassy state is one of its most important characteristics. Polymers with tunable glass transition temperatures have potential as rational drug delivery systems. The aim of this project is to determine the glass transition temperature (T_g) of polystyrene nanospheres in an aqueous suspension using both intrinsic and extrinsic fluorescence methods. For intrinsic experiments, the fluorescence of polystyrene itself will be measured. In the extrinsic experiments, polystyrene will first be labeled with either MA-pyrene or vinyl anthracene, respectively, and then the fluorescence of the label will be monitored. Samples will be heated well above T_g and the emission spectra will be measured. The temperature will then be decreased in intervals of 5 K with the spectra being measured at each interval. T_g will be determined by the temperature dependence of the ratio of the intensity of the third peak to the intensity of the first peak (I_3/I_1) of the emission spectra.

Presented: Tower Day

Funded by: CSU's Student Research and Creative Endeavors Grant (SRACE)

Community Presentations

The goal of the community presentations is to provide information to the community about the project and to receive feedback from the community. The presentations will be held at the following locations:

- Community Center
- Public Library
- City Hall
- Police Station
- Fire Station
- Post Office
- Bank
- Gas Station
- Convenience Store
- Pharmacy
- Restaurant
- Bar
- Hotel
- Motel
- Apartment Complex
- Office Building
- Warehouse
- Factory
- Construction Site
- Public Works Department
- Police Department
- Fire Department
- Public Safety Department
- Health Department
- Social Services Department
- Public Works Department
- Police Department
- Fire Department
- Public Safety Department
- Health Department
- Social Services Department

Community Presentations
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 Bank
 Gas Station
 Convenience Store
 Pharmacy
 Restaurant
 Bar
 Hotel
 Motel
 Apartment Complex
 Office Building
 Warehouse
 Factory
 Construction Site
 Public Works Department
 Police Department
 Fire Department
 Public Safety Department
 Health Department
 Social Services Department

COMMUNITY PRESENTATIONS

Best First Line of Treatment for Anxiety

*Emem Etim
Letrisha Karcz
Ruth Taye
Eva Griffin*

*Faculty Mentor:
Dr. LaTonya Santo
Dr. Cheryl Smith
School of Nursing*

The goal of the project was to find the best evidence-based practice for anxiety treatment in the elderly and to determine which treatment is most cost effective, possesses fewer side effects, promotes independence, and improves patient's overall health. The current problem in clinical practice is that pharmacological intervention remains the first line of treatment for anxiety. Older adults are more likely to have chronic diseases and use a variety of medications to treat them, which puts them at risk for polypharmacy, drug-drug interactions, and undesirable side effects. With the elderly, there are natural changes that cause drugs to stay longer in their bodies such as reduced liver metabolism, relatively lower serum protein concentration, and impaired kidney clearance. These natural aging processes increase the risk for toxicity. The solution to this problem is the implementation of non-pharmacological therapies such as Cognitive Behavior Therapy and Complementary Therapies to treat anxiety. Interventions to be implemented are deep breathing, massage, meditation, music therapy, mild walking, and active range of motion. The relevant literature was reviewed using CINAHL (Cumulative Index to Nursing and Allied Health Literature). All articles used were published within the last five years. The keywords searched were anxiety, elderly, pharmacological intervention, non-pharmacological intervention. The research studies used for the project were meta-analysis of randomized controlled trials, systematic review, quantitative review, and randomized control trials. Evaluation of the proposed solution yields that cognitive behavior therapy and complementary therapies like exercise, yoga, and deep breathing are just as effective as pharmacological therapy.

Presented: St. Francis Hospital, Tower Day

Best Practice for Assessing and Treating Newborn Jaundice

The purpose of this research is to find the best practice for assessing and treating newborns with hyperbilirubinemia. Hyperbilirubinemia, also referred to as jaundice, is an illness characterized by excessive levels of bilirubin that accumulate in the hematological system. In order to determine the most effective way to assess and treat newborn jaundice, research was conducted during the fall semester of 2013. Research included scholarly, peer-reviewed articles that were found through Galileo and nursing journals. Interviews were also conducted with nurses who have experience in working with newborn jaundice. In order to effectively assess newborn jaundice, one must take in account yellow discoloration of the skin and eyes, excessive weight loss, urinary output and stools, poor feeding, and bilirubin levels. Kramer's rule, a visual assessment, is also effective in assessing newborn jaundice. The best practice for treating newborn jaundice includes breastfeeding or supplemental feedings for mild cases, phototherapy for more severe cases, and blood transfusions in extreme cases. However, phototherapy using LED lights is the gold standard for the treatment of newborn jaundice.

*Keandra Ferguson
Lanise Barnett
Kourtney Grier
Nikisha Lee
Jackie McNiell
Candice Sullivan*

*Faculty Mentor:
Dr. LaTonya Santo
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School of Nursing*

*Awarded: Best Poster at Tower Day
Presented: St. Francis Hospital, Tower Day*

Pediatric Pain Protocol

*Erica Sheehan
Reepa Patel
Sa'Honey Finney
Carrie Cobb
Macy Lammert
Daniel Collins*

*Faculty Mentor:
Dr. Dell Miller
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Pediatric pain is not consistently assessed thoroughly or accurately in the clinical settings. Better assessment scales should be more widely adopted and used in planning care. The reason for this research was to efficiently treat pediatric pain with the most optimal patient outcomes. Research found that pain could be treated in many different ways including pharmacological care with both opioids and non-opioid analgesics as well as non-pharmacological care based on a thorough patient assessment using the FLACC scale. The expected outcomes of the research were to conduct more thorough assessments and implement appropriate and sufficient interventions. Research began in June of 2013 and studies were concluded in November of 2013. The articles used for research were found through Galileo based on a refined search using: pediatric pain, FLACC, evidenced based, best practice, improved patient outcome, and non-pharmacological pain techniques. Evidence used was limited between the years of 2009 to 2013. No further research is needed at this time. Implementing pediatric pain management based on a protocol incorporating the FLACC scale proves as a successful improvement over the current standards of practice that are widely used. Some institutions have reported that they have begun to use FLACC assessments following presentation of the research findings. Further adoption by more institutions should follow in order for the researched practices to become a new standard.

Presented: Columbus Regional Healthcare, Tower Day

Controlling Exercise Induced Asthma in Children

The purpose of this evidenced-based research project was to show how controller treatment and reliever treatment improve the management of exercise induced asthma. The research question developed by the group was in pediatric patients with asthma, how does controller and reliever treatment improve the management of exercise-induced asthma? The research methods used were randomized control trials, controlled trials, observational studies, and opinions from an expert panel. The database Galileo was used to conduct the research relevant to the research question. The research findings revolved on the use of controller and reliever treatment to help avoid the symptoms of exercise-induced asthma in pediatric patients. The results displayed a significant impact on patient outcomes and nursing care. The major recommendations found throughout the research is to first assess asthma severity to decide initial therapy, on follow-up, assess asthma control and step therapy up or down, check adherence to therapy, apply step approach to asthma management, use lowest treatment level required to maintain control, and provide warning for use of long-acting beta2-agonist in pediatric patients. To aid in the care of pediatric patients who suffer from exercised-induced asthma or asthma in general, we proposed to implement school-based preventative asthma care technology in the school systems. The technology would provide effective and timely communication between the school and providers. It would include symptom screening, follow-up assessments, and electronic communication with providers at a click of a button. The web-based program will provide a more accessible way of asthma care to high-risk children in schools.

*Kelley Straughter
Rosemarie Carlisle
Rachel Tomno
Hayat Sultan
Oluchi Nwogu
Mabel Chidozie*

*Faculty Mentor:
Dr. Dell Miller
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Implementing the Use of Medical Honey

*Alisa Valles
Alicia Bradley
Ashley Bush
Alexandra Denzik
Ashley Lopez-Gonzalez
Jessica Peck*

*Faculty Mentor:
Dr. LaTonya Santo
Dr. Cheryl Smith
School of Nursing*

Healing wounds successfully is not a new concept to the medical world. Initiating the healing process through the use of medical honey, however, is a more novel thought. After careful review of multiple randomized control trial (RCT) studies, the benefits of medical honey exemplified overwhelmingly positive evidence in the improvement of healing time in wound treatment; specifically with burn wounds. Honey is naturally sterile with innate antibacterial, antiviral, and antifungal properties. Until recently, Silver sulfadiazine (SSD) was considered the primary choice for wound healing by most practitioners. Medical honey promoted epithelialization of burn wounds in 56% of patients by day five following initial treatment compared to day 16 with initial treatment using SSD. Honey has been shown an effective antimicrobial against both gram-negative and gram-positive bacteria. Research shows that of 25 patients with positive swab cultures that were taken during admission, 23 were rendered negative for bacteria after being treated with honey for one week. Sterility within the wound bed occurs even faster when a medical honey dressing is applied within one hour of initial burn injury. Medical honey also prevents biofilm formation and will destroy already established biofilms when used in higher concentrations. Currently, more studies need to be completed as it proved difficult to access journals based in the United States.

Presented: Midtown Medical Center, Tower Day

PROJECTS PRESENTED AT TOWER DAY

Tower Day is an annual showcase for undergraduate research and creative endeavors sponsored by the Columbus State University's Honors College. Undergraduates from all disciplines were invited to submit their proposals for presentations, posters and panel discussions. Those selected were invited to the day-long colloquium on April 15, 2014, which hosted 180 researchers presenting to an estimated audience of 345.

During the event, undergraduate presenters were judged by a panel of faculty and honors students. Ten projects, including five presentations and five posters, were selected to receive Outstanding Research & Creative Scholarship Awards and recognized for their achievement at the annual Scholastic Honors Convocation. Those who have granted permission to print their abstracts are included in this publication.

Patronage: The Renaissance and Now

Patronage of the arts became prevalent in the Renaissance period. Monarchs, aristocrats, and even the church paid artists to complete works. Many pieces commissioned during the Renaissance signified the hallmarks of the rich and powerful and represented wealth, cultural leadership, political influence, or secular and religious dominance. The Medici family and the leadership of the Roman Catholic church were very prominent in Italy (Florence and Rome) during this period, relying on the plethora of artists that flourished at this time. Over the centuries, patronage has evolved matching the ideologies of the age. The basic principle of paying artists for their work continues, although the methods of payment have changed. Some artists are able to support themselves without patrons, mass-producing a single work to a fan base of millions of people. Models of success such as these have given rise to the popularization of crowd funding and group-based patronage. Kickstarter.com and patreon.com are examples of web sites that provide artists and producers with platforms to market themselves. Today, patronage of the arts is often supported by groups of people rather than one person or family seeking secular or religious dominance, as was the case in the Renaissance period.

Thomas Adams

*Faculty Mentor:
Dr. Andrée Martin
Schwab School of Music*

Collaboration in Reading

Emily Barnett

*Faculty Mentor:
Dr. Gregory Blalock
Teacher Education*

The Purpose of the article is to examine the research on collaborative teaching methods and their correlation with improvement in students with learning disabilities in reading. This article will outline different strategies and their specific outcomes. It will work to prove that collaboration is a necessity in today's schools if there is to be any improvement in the literacy of America's youth. This article will go into detail about the statistics of American students as related to literacy, and the way that those statistics effect not only students in the long run, but teachers and other education professionals. This article will also address what it takes to collaborate and what collaboration looks like when done properly. It will address the issues with collaboration and the fact that many educators do not use collaboration, and do not want to use collaboration.

Presented: Tower Day

Predatory Damage on Decoy Frog Prey

The many rain forests that exist in the world are home to an immense amount of life. Among the many species of life which live in these ecosystems, are the arboreal and land frog species. Throughout years of evolutionary adaption, these species have inherited complex traits which have allowed them to successfully reproduce and survive from predators. These complex traits can be categorized into two different types, one being camouflage, which allows for certain frog species to blend into their surroundings, making them extremely harder to be found by predators, and secondly, bright colors such as red and blue gives predators the indication that it has toxic elements which should be avoided at all costs. These two evolutionary tactics for survival have been notably successful in the proliferation of the abundant frog species found in rain forests. In search for answers as to what variable causes frogs to be more vulnerable to their predators, an experiment was conducted at La Selva Biological Station, located in Puerto Viejo, Costa Rica, which quantified the amount of predatory damage inflicted in regards to the color of the frog. This experiment was conducted with the expectation that brighter colored frogs would be more susceptible to predatory damage, due to the fact that it is an easier target to distinguish. In the time of three days, 12 molded clay frogs each representing a different color(green, red, and brown), were put out in two different locations within the rain forest. These decoy frogs were placed in the same locations each day, two times a day, for three hour periods(morning and evening). The results quantified from this experiment contributed researchers with insight on which evolutionary trait was more dominant in survival methods among different frog species. Many frog predators are often underestimated by researchers when it comes to their intelligence level. As stated previously, brighter colors are an evolutionary adaptation which represents the presence of toxic material within the composition of certain frogs. With that being said, one must also take into consideration the predator's survival tactics by the means of learning to avoid bright colored frogs.

Jared Bies

Faculty Mentor:

Mrs. Elizabeth Klar

Dr. Harlan Hendricks

Biology

Presented: Tower Day

Who Provides Better Directions: Males or Females?

Shannon Brown

*Faculty Mentor:
Dr. Stephanie da Silva
Psychology*

This study aimed to provide evidence that females provide better directions than males. This study's participants included 44 college students (22 male and 22 female) at Columbus State University. Participants were selected conveniently by the researcher, and then video recorded as they provided directions to a commonly used building on campus. The directions then were analyzed for success and coded for inclusion of cues in any of four categories: verbal, non-verbal, landmark, and beacon. The only gender difference found in the present study was that females more than males used landmarks in their directions ($p = .095$). If given a larger sample size the data may suggest that females may be more proficient when giving directions. Potential limitations for this study and explanations for these limitations are further discussed.

Presented: Tower Day

What is the most effective management of hypertension in the elderly population to include compliance issues?

This project compared the use of lifestyle modifications in combination with prescribed medication to the use of pharmacological interventions alone for effective management of hypertension in the elderly patient. Through our research, we found that using pharmacological methods in combination with lifestyle modifications decreased blood pressure (BP) more efficiently. This decrease in BP may in turn reduce the chance of cardiovascular incidences. Recommended lifestyle modifications should include smoking cessation, a diet high in potassium and fiber and low in fats and sodium, and an increase in aerobic activities to forty minutes a day, three to five days a week. Suggested pharmacological therapies include Renin-Angiotensin-Aldosterone System or single pill combination therapy. To aid in elderly compliance with the above propositions, research shows that patient adherence is significantly increased when a nurse is used to manage follow-up care. Nurse management should focus on the importance of compliance, continuing education, and strict adherence to follow-up appointments. The research used to formulate our suggestions all contained studies which were conducted over the past five years and were extracted from the Galileo database. These articles were collected over a two month period from September through November of 2013. In conclusion, the evaluation of the conducted research supported our suggestions for lifestyle modifications and pharmacologic treatment in decreasing cardiovascular incidences.

*Abigail Brubaker
Kaleigh Beauchamp
Ashley Turner
Taylor Jones
Lauren Reader
Augustine Ohaeri*

*Faculty Mentor:
Dr. Sheri Novello
School of Nursing*

Co-teaching in reading and the collaborative efforts between general education and special education teachers

Carmen Brudnicki

*Faculty Mentor:
Dr. Gregory Blalock
Teacher Education*

This interactive presentation investigates the importance of the collaborative efforts of teaching between general education and special education teachers and how those efforts affect the learning outcomes of the students introduced to them. Additionally, this paper addresses Murawski (2012) comments regarding the benefits of collaboration by placing special focus on several necessary collaboration methods: team teaching, parallel teaching, one teach, one observe; and alternative teaching. Furthermore, it was found that when combined, these proposals gave students the ability to learn in a different way and an opportunity to overcome their individual weaknesses as they were surrounded by at least two teaching professionals at any given time during classroom instruction to maximize learning potential. With regard to the two aforementioned collaboration methods, other studies have also praised teacher collaboration, explaining how combining the ideas of several teachers in real-time during classroom instruction can effectively address the learning struggles of students in the classroom in less time vs. traditional, one teacher per classroom teaching methods.

Presented: Tower Day

Nicotine Abstinence and Relapse: Attention to Social versus Environmental Cues

When people are addicted to a substance, namely nicotine, and attempt to quit there are several factors to take into consideration regarding the success rate. Some people report they are unable to quit because of being around other people who are smoking while others report that familiar environments affect them. This study used a basic selective attention task (i.e., flankers task) to assess whether pictures of people smoking or pictures of environments in which smoking occurs were more likely to capture the attention of the participant. This was measured by analyzing the response time (RT). A paired-samples t-test found a statistically significant difference in RT between social cues ($M=444.05$, $SD=52.34$) and environmental cues ($M=426.24$, $SD=46.32$); $t(60)=4.85$, $p<.001$. In contrast to the hypothesis, these results suggest that environmental cues cause a reduction in response time. Therefore, environmental cues such as cigarettes or places where smoking occurs should be avoided when attempting to stop smoking.

Carla Burton

*Faculty Mentor:
Dr. Rose Danek
Psychology*

The Imperialist's Burden: Kipling's Multifacetism in Literature

Marlena Cameron

*Faculty Mentor:
Dr. Neal McCrillis
History & Geography*

Despite the popularity of Rudyard Kipling's *The Jungle Books*, Kipling is best remembered for his poem "The White Man's Burden," frequently cited in classrooms as a classic example of imperialist sentiment. Yet not all of Kipling's writing had an imperialist emphasis to it. Two of his works, "The Man Who Would Be King" and *Kim*, actually held much more nuanced messages, with *Kim* being published after "The White Man's Burden." Kipling, rather than being dismissively labeled an ardent jingoist by both contemporary and modern critics, should be recognized for being much more complex in both his writings and personality.

*Awarded: Best Presentation at Tower Day
Presented: Tower Day*

Diversity in the Honors Program

Honors colleges and programs provide students the opportunity to challenge their academics, boost their resume, and improve their societal skills. The objective of this project is to present strategies to better market the honors programs and colleges to all students from various backgrounds. There is a significantly reduced number of minorities such as athletes, men and especially African American men in honors programs in Georgia. Our ultimate goal is to present a marketing plan that will attract students, who are not only willing to improve their performance for themselves, but to make a difference for their university. The marketing plan is based upon information that will be collected from a review of literature as well as information collected at a focus group that will include individuals from these three different minority groups. Honors education is the perfect opportunity to allow all students to gain experiences that can only be provided by a well-developed honors program.

*Samantha Cook
Janell James
Amaka Iloegbunam*

*Faculty Mentor:
Dr. Cindy Ticknor*

Vigenère

Cherie Corning

Faculty Mentor:

Dr. Yesem Peker

*TSYS School of
Computer Science*

A Vigenère Cipher is an encryption technique that uses multiple shift ciphers in a sequence with different shift values to encrypt information. The sequence is referred to as the keyword. Knowing only that a piece of code was obtained using a Vigenère cipher, I will use a computer program to perform mathematical calculations to establish the length of the keyword. Once the length of the keyword is known, I will break the code into that many shift ciphers (one shift cipher per letter of the keyword). I will then use frequency analysis on each shift to determine the letter of the keyword that corresponds to that shift. By putting all the letters corresponding to the shift ciphers together, I will have the keyword and in turn will be able to decode the message.

Presented: Tower Day

Discovering Brunelleschi's Secrets to Building the Duomo

Santa Maria del Fiore was designed to be Florence's crown jewel. The cathedral's blueprint was larger than other Italian city's Cathedrals and it had a very elaborate exterior. Also, the Cathedral was planned with a dome ceiling larger than the Pantheon; however the knowledge to create the dome had been lost. In order to complete the church after a century of construction a contest was held to select the best architectural outline for the world's largest dome. Brunelleschi designed a plan to build a dome and presented his work to the committee. However, he refused to show the details on how the dome would be built since he was scared his plans would be stolen. My presentation will cover how Brunelleschi's training as a goldsmith would help him design and the build the greatest architectural feat of his time period. In addition, my presentation will discover building process for dome and how this process forever changed the world as we know it. Also, it will discuss the building techniques and new technology that Brunelleschi invented or rediscovered during his struggle to build the largest dome. A few years after the completion of the dome, Brunelleschi past away however, his accomplishments are still celebrated in Florence and around the world. The dome is Brunelleschi's most important contribute to the city of Florence. Quickly, the Florentine's recognized the importance of his work and it soon became the symbol for Florence. The Dome represents the beginning of the Renaissance and the rediscovering of lost knowledge in addition to modern technology. Visitors travel around the world to visit this building and learn about its historical importance. Without the plane ticket to Italy, Brunelleschi's dome will come to life in my presentation.

Lydia Davenport

*Faculty Mentor:
Dr. Susan Hrach
English*

Presented: Tower Day

Inclusive Community with a Post-Secondary Institution: An Act of Collaboration through the Efforts of a Mentor

Lindsey Davies

*Faculty Mentor:
Dr. Gregory Blalock
Teacher Education*

Inclusive post-secondary education is becoming increasingly popular across college campuses, providing individuals with intellectual and developmental disabilities (I/DD) the opportunity to attend college in a certificate program. Students with I/DD thrive in the social, educational, and employment opportunities that colleges have to offer and grow immensely as active participants in the community. Students with I/DD are traditionally paired with a mentor, someone who helps them navigate their way around campus, attend social events, find the best places to eat and exercise, and help communicate their needs to faculty and staff around campus, in order to help them transition to life on campus. The mentoring support works similar to a scaffolding method. That is, the more confident the student with I/DD becomes and the more they can advocate for themselves, the less the mentor needs to provide the mentee. However, the introduction of the student with I/DD to campus is not a smooth transition. It is crucial that the mentor has strong collaboration skills to create an inclusive community on campus. The mentor is responsible for understanding that collaboration involves parity, volunteering, shared decision making, resources, and accountability, and mutual goals to work towards. This presentation focuses on how the mentor collaborates with multiple aspects of campus to create an inclusive community for a student with I/DD to feel welcome and be actively engaged, and how collaboration is essential to achieving an inclusive community at a post-secondary education institution.

Presented: Tower Day

Educational Collaboration: The Importance of Inclusion

Today's society is proceeding to expand in the development of various people and professions who collaborate, specifically in the realm of education. In regard to the system of education, collaboration can involve educators, administrators, parents, students, and others working together in order to ensure the achievement and success of all students. When all of those people work together to advocate for the success of all students, they are collaborating for inclusion. Inclusion involves a general education teacher and a special education teacher working together to collaborate, co-teach, and integrate students with diverse abilities and backgrounds. Although students learn alongside each other in an inclusive setting, instruction must be differentiated and students must be accommodated based on their individual needs. Also, students with exceptionalities may need accommodations and/or modifications based on their Individualized Education Programs that are required to be implemented in the least restrictive environment; all of this must be considered as well as the well-being of all other students as well. Inclusion is not an easy task; this is why collaboration for inclusion is so important. In the past, students with disabilities have been served in secluded classrooms which, in certain cases, are not the least restrictive environments. However, through extensive research, studies have shown various teaching strategies and approaches that can easily be implemented to ensure successful collaboration for inclusion and the success of all students.

Telea Davis

*Faculty Mentor:
Dr. Gregory Blalock
Teacher Education*

Pharmacotherapy Effectiveness in Children with Attention Deficit Hyperactivity Disorder

Ashley Dunn
Lorie Engleking
Erin Fletcher
Simone Knight
Emily Myers
Estella McCall

Faculty Mentor:
Dr. Dell Miller
School of Nursing

While pharmacotherapy alone seems to manage Attention Deficit Hyperactivity disorder (ADHD) symptoms in children, there is evidence to suggest that complementary therapies in conjunction with pharmacotherapy are the most effective means of symptom management. Results from multiple randomized control trials, comparative studies, cohort studies and efficacy studies, combining pharmacotherapy with education, behavioral therapy, and peer mediated interventions involving yoga and play therapy reduced ADHD symptoms in children more than pharmacotherapy alone. Education, provided by an assigned nurse liaison, helped to set expectations for treatment and increase the effectiveness of pharmacotherapy through better compliance. Behavioral therapy replaced undesirable behavior with desired behavior and in turn reduced the symptoms of ADHD in children. Evidence suggests peer mediated interventions involving yoga and play therapy reduce the symptoms of ADHD in children and improve scholastic performance. Research indicates the decrease in ADHD symptoms in children through pharmacotherapy and complimentary therapies will significantly improve the quality of life for the numerous children living with the disorder as well as their families though more time and investigation into the subject is needed.

Presented: Tower Day

Implementing Change in Obese Women Before and During Pregnancy

Obesity during pregnancy can cause an array of fetal and maternal complications while negatively impacting clinical time and resources. The purpose of this project is to identify methods to decrease the prevalence of obesity to help reduce maternal and fetal complications and lower costs for health care systems. Behaviors which lead to the status quo were identified such as pregnant women thinking they should eat for two and health care providers feeling uncomfortable discussing the patient's weight. A restraining force included physician's assuming obese pregnant women understood the risks associated with obesity and pregnancy. Although, this project found that when women were educated to these risk factors, they were more inclined to make lifestyle modifications including eating a proper diet and participating in physical exercise. Diet and exercise counseling by a food technologist and educating health care professionals on how to address weight management were noted as ways to reduce obesity in pregnant women. An integrative literature search of major databases including CINAHL and ProQuest was undertaken in order to find English language journals using the key words 'pregnancy', 'obesity', and 'nutrition'. The search was limited to the previous five years of publication, 2008 to 2013, so that the results were current and relevant to evidenced based practice. This research concluded that weight must be measured and tracked at every doctor's appointment, standardized weight control questions should be added to each appointment's assessment, and the use of a food technologist should be considered by health care providers.

*Brynden Ferguson
Tiffany Lewis
Meghan Mackey
Trisha Taylor
Jesica Williams
Melissa Wood*

*Faculty Mentor:
Dr. LaTonya Santo
Dr. Cheryl Smith
School of Nursing*

Using Station and Team Teaching in the Inclusive Middle School Math Classroom

Phyllis Fox

*Faculty Mentor:
Dr. Gregory Blalock
Teacher Education*

At a conference on special education in 1994, it was determined that individuals with disabilities benefited from an inclusive environment. According to my research, an inclusive education entitles all students access to the same curriculum. As a result, inclusion classrooms have become a common setting in our schools today. Many general education teachers, middle school math in particular, found themselves in challenging situations. Therefore, schools began incorporating a different style of teaching. Co-teaching involves the pairing of a general and a special education teacher working together in an inclusive classroom utilizing various types of strategies. This presentation will focus on the description of two of these strategies and give examples of how these teachers might use them to support individuals with or without disabilities.

Presented: Tower Day

Co-Teaching and Peer Collaboration to support math

The incorporation of federal laws such as The Individuals with Education Act (IDEA) and The No Child Left behind Act (NCLB) into today's schools has helped to make the inclusion of students with disabilities in the general education classroom an important outcome. However, the successful inclusion of such students often requires a sophisticated level of collaboration within the classroom. For example, the inclusion of students with disabilities can be supported by the use of a co-teaching arrangement, in which a general education teacher and a special education teacher works together to deliver instruction to a diverse group of students within a single space. In addition, inclusion has been shown to be successful with a good co-teaching team who use student centered instructional strategies such as Peer Assisted Learning Strategies (PALS) (Sileo, & Garderen, 2010). PALS involves groups of students independently collaborating with one another to improve content area skills. PALS enables the co-teachers to circulate around the classroom to observe students, provide immediate feedback, and offer remedial one on one instruction when necessary. This presentation shows how the use of multiple forms of classroom collaboration, via co-teaching and PALS, can support math achievement for students with and without disabilities in the general education classroom.

Kimberly Fussell

*Faculty Mentor:
Dr. Gregory Blalock
Teacher Education*

Co-Teaching: a Positive or Negative?

Casey Googe

There are many different ways to co-teach in a classroom, but it will always consist of multiple teachers collaborating and trying to teach students in their least restrictive environment. Co-teaching has been proven to be an extremely successful situation or a complete failure. According to the literature, teachers and students have mixed emotions on whether co-teaching is a positive or negative thing for the classroom.

*Faculty Mentor:
Dr. Gregory Blalock
Teacher Education*

Presented: Tower Day

Efficacy and Safety of Nicotine Replacement Therapy for Smoking Cessation in Pregnancy

Smoking has been identified as harmful to both a pregnant woman and her unborn child. The best outcome for both mother and child would be for the woman to discontinue smoking during pregnancy. If the mother is unable to stop of her own accord, then help could be given in the forms of counseling or pharmacological support. Research was obtained from the Galileo database through Columbus State University to identify applicable behavioral modification theories and to evaluate the safety and efficacy of pharmacological support in the form of nicotine replacement therapy (NRT). Three randomized control trials dated from 2008 to 2013 were analyzed that used nicotine patches, gum and placebos. Evidence based research did not support the use of NRT during pregnancy. Coleman (2012) and colleagues found that supplementing behavioral support with a nicotine patch was no more effective than a placebo delivery. The research done by Oncken (2008) and his team found clinical significance in that babies born to mothers who used NRT had fewer preterm births and higher birth weights. More research is needed on NRT during pregnancy in order to determine the safety and efficacy. Cessation therapy is recommended through behavior modification with the assistance of the healthcare provider.

*Loren Gorman
Elisabeth Kirkland
Taylor Caldwell
Mary Phelan
Heather Roettger*

*Faculty Mentor:
Dr. LaTonya Santo
Dr. Cheryl Smith
School of Nursing*

The Patronage System of Musicians in Renaissance Italy and the Development of the Ricercar

Katherine Holmes

*Faculty Mentor:
Dr. Andrée Martin
Schwab School of Music*

Renaissance Italy was a difficult time and place for composers to thrive, but in cities such as Florence and Milan there were ways to make a living, such as composing and playing for weddings, festivals, and church services. Many important figures, such as Lorenzo the Magnificent (1449-1492) wrote songs and helped composers find performance opportunities. Francesco Canova da Milano (1497-1543) led a school of lutenists and composers in 16th century Milan, and is now known as one of the foremost composers for the lute (and guitar) from the Italian Renaissance. He, along with many other composers at the time, utilized the ricercare and fantasia forms, which became very influential in the late Renaissance and the Baroque periods. His Fantasia (Ricercar) #6 provides a strong basis for the analysis of both these forms.

*Awarded: Best Presentation at Tower Day
Presented: Tower Day*

Gait Training in Elderly Patients

In 2008, a law was passed stating that Medicare and Medicaid will no longer reimburse hospitals for certain preventable conditions, including falls. An increase in gait training as been thought to decrease falls in elderly patients (65 years and older). The objective of this study was to summarize and use the evidence related to gait training and falls in elderly patients to establish a simple gait training that can be performed at hospitals when getting the patient up to use the restroom or other times throughout the day. We searched Galileo for articles between 2008-2013 using key words such as elderly, risks and falls. We found 100, 275 that included meta-analysis and randomized control trails. We focused on three articles that used various types of gait training to decrease elderly patient's risk of falling. All three articles showed that a minimum of 20 minutes of gait training 3-5 days weekly decreased elderly patient's risk of falling. Based on this, we designed a gait training guideline that could be implemented into hospitals. Any time that the patient is getting out of the bed, nurses should utilize to apply gait training techniques. Begin by ensuring patient safety by checking the surroundings. Help the patient slowing out of the bed and to steadily ambulate around the perimeter of the bed. Then help the patient back into the bed safely. The conclusion of the study was to establish this simple gait training can reduce falls in elderly patients saving the hospital thousands of dollars a year.

Miranda Holsenbeck

Tia Moorehouse

Mita Chauhan

Ba'Sharra Moors

Faculty Mentor:

Prof. Anthonia Imudia

School of Nursing

"Da Klaw"

*John Hood
Larry Williamson
Robert Reynoso
Hunter Hall*

Columbus State University's Robotics Program has been working diligently on a robotic hand that has been designated Da Klaw. This project is in coordination with Inmoov and the Coca Cola Space Science Center. In this presentation we will show how the students have used 3-D printed parts along with Arduino robotics software and circuit boards to assemble and animate the robotic hand. We will also explain future plans for the project and step by step explanation of the process used to create the robotic hand.

*Faculty Mentor:
Dr. Lavi Zamstein
Earth & Space Science*

Presented: Tower Day

Broadening Our Horizons

For the past two years Columbus State University's Coca Cola Space Science Center's MeadWestvaco Observatory has been undergoing a series of upgrades. This year, the largest portion of upgrades has been completed. I will be discussing the process involved with calibrating the new CDK24 Planewave telescope as well as other new equipment that has been used and ordered in order to further the breadth of student research. I will also be discussing the new branches of astronomical research that will be available for future students interested in the field of astronomy. The purpose of this paper/presentation will be to explain the importance of having a state of the art facility capable of conducting astronomical research.

John Hood

Faculty Mentor:

Dr. Rosa Williams

Dr. Shawn Cruzen

Earth & Space Science

Comparing and Contrasting Computer Forensic Software for Smartphones

Jordon Huffman

Faculty Mentor:

Dr. Lydia Ray

TSYS School of Computer Science

Under the umbrella of computer science, there exists the field of computer forensics. The term “computer forensics” deals with the collection and preparation of digital evidence to be used in a court of law. Basically, computer forensics is the fusion of computer science and criminal justice. A computer forensic specialist must comply with every law and restriction that a police officer follows. If the evidence is not kept in a certain manner, the case will be dismissed without question. Smartphone forensics is one specific category of computer forensics. This branch of digital forensics focuses specifically on how to extract digital evidence from smartphones. The Internet provides access to software that can extract this data. Commercial and open source tools fill the search engines of college students and professionals wanting access to this technology. The steep prices of the commercial products make most people turn to the open source tools, but can the open source products compare with the power of the commercial funding? With so many software options available, which particular tool is the most cost effective for students who are interested in the field? My goal is to compare and contrast open source and commercial forensic tools to find out which one provides the most features for the best price.

Presented: Tower Day

Predicting Freshman Retention

The purpose of this project is to apply a form a statistical analysis, k-means clustering, to roughly six thousand student records between the years of 2006 and 2011, in order to better predict freshmen retention. This approach recognizes that students fail to return to Columbus State University for many different reasons, and that some percentage of dropouts can not be retained, regardless of efforts made. Therefore, this approach seeks to filter out these students that can not be retained, in order to identify students whose dropouts can be prevented. This information can be used in order to identify at-risk students, and hopefully get them the assistance needed to retain said students.

Aaron Jeter

*Faculty Mentor:
Shamin Khan
TSYS School of Comput-
er Science*

The Clustering analysis seeks to identify clusters, or groups, of students who match a similar profile. My expectation is that unpreventable student dropouts match certain profiles, while preventable student dropouts match other profiles. Specifically, previous research leads me to believe that unpreventable dropouts will match profiles similar to successful students, while most preventable dropouts will not.

Ultimately, the goal of this project is to create a model capable of predicting students at risk of dropping out due to preventable causes.

Importance of Family Planning

*Lauren Johnson
Richa Bhatt
Brittney Browning*

*Faculty Mentor:
Dr. Kathleen Hughes
Biology*

Women who are sexually active that currently do not want children often do not consider the ramifications of how their actions could affect their future family plans. According to the Guttmacher Institute, about half of the pregnancies in the United States are unplanned. Many women are unaware of the different approaches for prevention and are also misinformed about the many methods that are now available to be used for contraception. Due to this lack of information concerning these issues, this has led to unwanted pregnancies, sexually transmitted diseases (STDs) and other complications. Creating a family plan is important to ensure that these issues do not occur and that the family goals are met and supported. Family planning can prevent pregnancy-related health risks in women, reduce infant mortality, prevent HIV and AIDS, promote education, decrease pregnancies in young adults, and slow the growth of the world population. There are several different methods that can be used for contraception; however, some are more reliable than others. Different methods can be better suited for each specific individual. There is no correct method; each has its benefits and drawbacks and it is important for each individual to determine which method is best for them. When creating a birth control plan, it is essential to consider effectiveness, cost, health risks associated with the method of choice, partner involvement, whether it will be temporary or long term, protection against HIV and STDs, and availability.

Presented: Tower Day

Peer Collaboration: Effective Strategy for an Inclusive Classroom

There is wide variety of learning styles and abilities in classrooms today. It is becoming increasingly important for teachers to find instructional strategies that help all students gain the understanding they need. In an inclusive classroom, this is a big priority. Inclusion is an educational practice of providing within the general education setting all the educational services students with disabilities require. Peer collaboration is a strategy that helps all students actively participate and gain understanding. It is easy to implement and research proven to be an effective method. It allows students of all levels to work together and encourage each other in their learning environment. In this presentation, peer collaboration will be defined. We will discuss what needs to happen in a classroom for peer collaboration to be effective, and why it works. And lastly, a real world example will be presented that can be easily implemented in any classroom.

Amy Labas

*Faculty Mentor:
Dr. Gregory Blalock
Teacher Education*

Excavating the Stellar Graveyard: Searching for Supernova Remnants in the LMC

*Jeremy Miller
John Hood
Nick Carpenter*

*Faculty Mentor:
Dr. Rosa Williams
Earth & Space Science*

A supernova is a violent burst of radiation that is one of the most extraordinary events to occur. These large bursts of energy are a primary source for cosmic rays, and they enrich the interstellar medium with high mass elements. These supernovae leave behind traces of gas and dust that are overrun by the supernova's blast waves which form diffuse remnants that are visible even after a large period of time since the actual event. The Large Magellanic Cloud is a nearby galaxy seen in the southern hemisphere's sky and still has an abundance of supernova remnants (SNRs). These SNRs are detected using photon detection of specific energies, and these SNRs are known to produce low energy x-rays along with other corresponding energies associated with these remnants. We will be using low energy x-ray imaging, visual imaging, and radio imaging in order to find the older and more difficult to find SNRs that have not been spotted yet in the LMC. In addition to finding the SNR candidates, we will be supporting limited claims with spectral analysis where possible.

Presented: Tower Day

Female roles from different cultures shown through media: Is there a relationship between female portrayals in commercials and their country or region of origin?

The purpose of this study was to assess the portrayals of females in commercials across the world. Eleven categories of female portrayal were used: sexual/ flirty, professional, friendly, dangerous, homemaker, trendy, children, voice-over, vulnerable, neutral, and not applicable. We analyzed 1520 commercials from 10 countries or regions to determine if females are portrayed differently across cultures. There was a relationship between friendly portrayals and region ($p=.063$) and between homemaker portrayals and region ($p=.019$). South America (31.5%) India with 35% had the highest percent commercials with women portrayed as friendly. Asia had the lowest percent (13%) of commercials containing friendly portrayals of females. From the Middle East, 57% of commercials portrayed women as homemaker whereas only 9.25 % of commercials from South America portrayed women as homemakers. The role of women most prominently portrayed in commercials could reflect or influence the gender roles for women in that region of the world.

Aliesha Mumford

*Faculty Mentor:
Dr. Stephanie da Silva
Psychology*

CMSVega: A Content Management System for the Layman

Roshan Nedumprath

*Faculty Mentor:
Dr. Aurelia Smith
TSYS School of
Computer Science*

Content Management Systems are becoming increasingly convoluted to use. Existing website creation systems require users without programming knowledge to scour documentation. A CMS should be intuitive, something a user can pick up and use right away. Simplicity is key when targeting layman users who have no web development knowledge. This project aims to create a simple and intuitive content management system, CMSVega, which users can pick up and use with minimal web development knowledge. A blind study was conducted to compare CMSVega against popular Wordpress, Drupal and Joomla systems. After having recreated a webpage using each CMS, participants were asked to pick their favorite, where 70% chose CMSVega. Participants gave CMSVega a rating of over 76% satisfaction in categories such as ease of use, time required to complete task, and achieving overall success of task. The outcome of the results suggests that users favor simplicity in applications.

Presented: Tower Day

Different ways to collaborate with special education in a general education classroom

The Individuals with Disabilities Education Improvement Act (IDEIA) explicitly emphasizes the importance of providing access to the general education curriculum so that students with disabilities can meet the educational standards that apply to all children. Because of this, students with disabilities are being educated in the general education classroom in many schools today. This inclusive education model relies on important aspects of collaboration via teacher-teacher (co-teaching) and school-family relationships to help assure student success. This presentation will focus on the different types of co-teaching arrangements and the importance of strong, positive school-family relationships.

Kellie Patzke

*Faculty Mentor:
Dr. Gregory Blalock
Teacher Education*

Implementing Station Teaching in an Inclusion Classroom

Meghan Person

*Faculty Mentor:
Dr. Gregory Blalock
Teacher Education*

The purpose of this presentation is to inform teachers about a particular co-teaching method, station teaching. Children with disabilities are the main focus of the co-teaching practices and teachers need to collaborate to implement differentiating instruction to meet each student's needs. Since the Individuals with Disabilities Education Act (IDEA), students with disabilities are included in classes with students without disabilities. There are six different co-teaching methods and implementing station teaching can benefit all students by providing each student one-on-one services from teachers. Station teaching can be used in all content areas and allows two teachers to work with a group of students to meet each student's academic goals. The process of how to implement station teaching is provided within the text. It is best that teachers begin with two stations at first and then slowly work toward adding more stations. Both teachers and students benefit from the station teaching method. Students get more instructional services and teachers are able to give feedback to each student. Station teaching is a resourceful method of co-teaching to maintain the instructional focus of a lesson while keeping each student's goals in mind.

Presented: Tower Day

Here a Station, There a Station, All Around the Classroom We Play and Learn in Stations: How Children With Exceptionalities Can Benefit From Station Teaching

Station teaching is an instructional educational strategy that is utilized in education to enhance students learning. Station teaching addresses such content areas as math, reading, writing, and science. These stations can be customized according to student learning needs. Some of the benefits that teachers have cited regarding the use of the station teaching method include the fact that it allows teachers to focus on more than one concept while providing students the time needed to complete activities, discuss content, and answer higher-order questions. Station teaching also has the ability to help students with learning disabilities become more independent in the classroom because it allows them to learn at their own pace.

Lauren Pickard

*Faculty Mentor:
Dr. Gregory Blalock
Teacher Education*

Evolving Communities for the Iterated Prisoner's Dilemma

Geoffrey Platta

*Faculty Mentor:
Dr. Jon Dana Eckart
TSYS School of
Computer Science*

Cellular automata are finite state machines which interact with each other according to some pre-defined set of rules. Cellular automata are Turing-complete, and simple rule sets can often lead to complex behaviors. The iterated prisoner's dilemma is a particular rule set for cellular automata adopted from the prisoner's dilemma, a game in which two people, without communicating, can choose either to deny involvement or snitch on the other person over some anonymous crime, with various payoffs to each player according to the four possibilities. In the iterated prisoner's dilemma, the game is repeated, with people (represented by cells) playing against their neighbors, and strategies—sets of moves either periodic in nature or determined by how the other player has played historically—are measured against each other by the points they accumulate. The Nash Equilibrium in the Prisoner's Dilemma is to defect, and in the Iterated Prisoner's Dilemma with a known game length is to always defect, but when the length of the game is unknown, there is no Nash Equilibrium and different strategies can maximize the point values by cooperating. This presentation examines a modified rule set such that people (cells) choose whether or not to play their neighbors in an iteration based on their history of cooperation, determining what thresholds for choosing not to play, and the length of past histories, cause communities of cooperation to emerge.

Presented: Tower Day

Interventions for Children with Autism

With a significant increase in the prevalence of autism spectrum disorders, we believe it is imperative to examine current treatment interventions to determine effectiveness in improving the prognosis for children with autism. We conducted research from five studies, which implemented The Early Start Denver Model, a home-based intervention therapy, improvisational music therapy, a joint-attention intervention, and Qiqong Sensory Training, using the CINAHL database. In evaluation of the outcomes of the research and evidence presented, the functional levels of autistic children were effectively improved in the areas of cognitive, social and communications skills. Further recommended actions would involve a time frame of therapy sessions between 25-45 minutes, initiation of intensive therapy between 24 and 30 months of age, and early comprehensive and intensive therapy sessions in the home, school, and outpatient setting with an interdisciplinary approach. These recommendations will aid in providing children with autism the opportunity to live happy and productive lives.

*Brittany Powell
Jennifer Bowers
Nashia McCoy
Nana Benma Osei
Kendria Thomas*

*Faculty Mentor:
Dr. LaTonya Santo
Dr. Cheryl Smith
School of Nursing*

Sustaining Weight Loss after Bariatric Surgery

Sabreena Randolph

DeLaSha Felton

Ava Rodriguez

Marlicia Watts

Jessica Williams

Faculty Mentor:

Prof. Anthonia Imudia

Sustaining weight loss is a major concern for obese patients who have received gastric bypass surgery. The project goal was to make a change in the current practices of care management for patients before and after gastric bypass or band surgery. The new change included mandatory training workshops for staff so that they will learn tips on exercise, nutrition, and stress management. The patients will be required to have check-ins that include weight and body mass index (BMI) assessment. They will also be required to keep daily diet and physical activity logs. Although time consuming, these interventions may decrease future weight gain and subsequently reduce obesity related diseases. For over a month, Galileo and other search engines such as Google were used to find articles relevant to this topic. The review of literature resulted in nine studies that supported lifestyle modifications to sustain the goal of weight loss for post-operative gastric bypass surgery. These articles helped support this new change in care management to better help patients reach their goals.

Presented: Tower Day

Co-teaching Strategies for a Successful Educational Environment

Co-teaching is a type of collaboration between two teachers whom have worked together to become one unit in the classroom. Because co-teaching is a process that requires at least two educators willing to work together, it is important that each educator has been trained about how to co-teach. Co-teaching is a successful practice when the educators are supported by administrators, have had the appropriate training, are given time to plan together, and are compatible. Knowing, and also understanding different types of co-teaching strategies is beneficial to all educators. This presentation will explain how different co-teaching strategies can help facilitate the needs of an inclusion classroom. It will define what co-teaching is and what this type of collaboration looks in a classroom. It will also explore how educators can use co-teaching as a tool to facilitate everyone's needs in the inclusion classroom. It will give ideas to administrators on how they can support co-teaching in their schools. During the presentation I will provide a detailed booklet of the different types of co-teaching strategies, how they can be utilized in the classroom, and what types of administrative support can foster the success of co-teaching.

Jennifer Redmond

*Faculty Mentor:
Dr. Gregory Blalock
Teacher Education*

Presented: Tower Day

An Analysis of the Cause, Effect, and Control of Hyperlipidemia From a Nursing Perspective

Melissa Rodgers

*Faculty Mentor:
Dr. LaTonya Santo
Dr. Cheryl Smith
School of Nursing*

Two of the top four causes of death worldwide, heart disease and stroke, are related to hyperlipidemia, elevated cholesterol levels; these two illnesses account for approximately seventeen million deaths each year (World Health Organization, 2014). In order to combat the prevalence of this illness, the National Cholesterol Educational Panel has issued guidelines regarding cholesterol management. Extensive research has been published concerning cholesterol management. However, a gap remains between evidenced-based practice and community awareness in order to decrease the incidence of this phenomenon. This manuscript compiles research from peer-reviewed nursing journals and acclaimed government and national organizations to express the cause, effect, and control of hyperlipidemia while identifying prevention strategies to decrease the incidence and prevalence of hyperlipidemia.

Presented: Tower Day

Gregorian Chant and its Uses in Renaissance Sacred Music

With its origin in Jewish sacred music, Gregorian chant has been the foundation for Christian sacred music for over a thousand years. Renaissance composers such as Dufay, Ockeghem, and Palestrina were greatly influenced by this art form and used it as a contrapuntal and thematic base in much of their sacred music. During a time of intense intellectual growth and religious reform in Italy, Renaissance composers were pushed to create new music while fulfilling the needs of the church. Through the exploration of compositional techniques, this research examines different forms of Gregorian chant and how Renaissance composers incorporated this art form into other forms of sacred music, including masses, motets, and music for the Divine Office.

Lauren Rosenblatt

*Faculty Mentor:
Dr. Andrée Martin
Schwab School of Music*

*Awarded: Best Presentation at Tower Day
Presented: Tower Day*

Universal Design for Learning: Student Access for Learning in an Inclusion Classroom

Jamario Shade

*Faculty Mentor:
Dr. Gregory Blalock
Teacher Education*

Both state and federal regulations require that students with disabilities be educated within a least restrictive environment (LRE). The Individuals with Disabilities Education Improvement Act of 2004 states the LRE is assumed to be in the general education classroom unless the student's services cannot be fulfilled in the general education setting. Therefore, the majority of teachers regardless of certification will have to teach a child who has a disability. The most nationally accepted practice for LRE is inclusion classrooms, where general and special education teachers are both actively delivering and preparing instruction.

Teachers with content area degrees often do not have the effective pedagogical practices to teach a child with a disability, nor does the special education teacher have the content knowledge to teach subjects like Physics. With the discrepancy of skills needed to meet all the needs of the students in the classroom, it makes co-teaching a difficult task to complete. When teachers can voluntarily collaborate with his or her co-teacher, it assists the process of serving all students in a creative dynamic way. This presentation will focus on how co-teaching, used in conjunction with Universal Design for Learning (UDL), can assist teachers on how to address the multiple learning needs of students. Every student comes with different experiences and perceptions of the world; a student's way of learning is as unique as his or her fingerprint. Further, this presentation will demonstrate important factors of UDL that will increase student's engagement and curiosity of the content area. In this way, co-teaching and UDL will take time to master delivering instruction to all students, but support the learning of all students in the content area being taught.

Presented: Tower Day

I Am for the Child: A Presentation in the Effectiveness of the Georgia Court Appointed Special Advocacy Organization

Each year, there are thousands of children taken into the State's Child Protective Service agencies. While these children are in the Care of Child Protective Agencies, families and children are in need of services to help strengthen the family and restore the home. One of the agencies known for their services provided to families is the CASA, or Court Appointed Special Advocates organization. This organization is dedicated to training volunteers to advocate for the best interest of deprived children.

Deja Thomas

*Faculty Mentor:
Dr. Kyle Christensen
Dr. Kimberly Gill
Political Science*

In this research presentation, I will explore the factors that contribute to the effectiveness of Court Appointed Special Advocacy organizations and the roles of the child advocate. Furthermore, I will compare and contrast the driving factors that influence CASA utilization throughout the State of Georgia. This paper will establish the definition of child maltreatment and measure the operative performance of child advocacy organizations by examining the needs of children, field professionals, and advocacy organizations' outcome. The goals of this study are to examine the youth population and the needs of youth served by CASA. This will be studied by examining the most current data of Georgia CASA organizations, the populations served by CASA, and current CASA services, in an effort to highlight the current state of the advocacy organization and the direction CASA will take to effectively advocate in the future.

Women In the Renaissance

Kara Ussery

Faculty Mentor:
Dr. Susan Hrach
English

Although the Renaissance was considered a period of great expansion for art, science, and philosophy (among other things), most of the figures associated with this growth were male. Is this because females were kept inside the home and not allowed to contribute, or have we simply lost track of the achievements they did accomplish? By looking at the responsibilities and lifestyles of women in the home, in the church, as patrons, in prostitution, and as artists, and by conducting case studies for each of these, I have managed to take a closer look at what it would have been like to be female in Renaissance Italy, and truly gain insight to the important contributions they made.

Presented: Tower Day

Eagle & Phenix Mills Alabama Tenant Housing, 1851 - 1939

This research and mapping project was performed in support of a Columbus State University History Department senior seminar on the Chattahoochee River Valley mills and in satisfaction of the requirements of an Advanced Geographic Information Systems course. It was designed to provide answers about a period of local history not yet well documented: the physical location and living conditions of Eagle and Phenix Mill operatives' Alabama housing. With the 1939 divestment of Alabama property, few records remained to address a nearly 80 year span of mill workers' lives at a single location. Research was conducted in both Alabama and Georgia with my primary research source being the Schwob Library manuscript collections. 1872 and 1886 maps established the village's location within a 26 acre 1862 Alabama land purchase; 1922 Sanborn Fire Insurance maps provided physical locations and structural makeup of the dwellings. A 1930 blueprint documented the village's public sanitation network while a 1936 insurance survey yielded specific street addresses as well as additional details of the houses. I digitally overlaid the 1922 maps onto a 2013 satellite image and, using a self-developed database populated with details garnered from the 1936 insurance survey and 1922 maps, produced a series of maps visually documenting various aspects of the mill operatives' housing. My project, while answering the initial query, suggested further research. What happened to the 58 English female operatives imported to work the newly installed English looms just after the Civil War? Did their dissatisfaction with mill management drive them from the area? Had multiple generations of some families worked for the mill? Were the "female boarding" houses, depicted adjacent to the Eagle and Phenix Mills on late 19th Century maps, owned and operated for unmarried female employees of the mill?

Joyce Wade

*Faculty Mentor:
Dr. Brad Huff
History & Geography*

*Awarded: Best Presentation at Tower Day
Presented: Tower Day*

Comparative Analysis of Water Samples in La Selva, Costa Rica

Katie Winkles

Kia Taylor

Faculty Mentor:

Mrs. Elizabeth Klar

Biology

The purpose of this project is to compare water variable measurements between the Puerto Viejo River and the creek branching off at the La Selva Biological Station in Costa Rica. The water variables that we measured are as follows: temperature, dissolved oxygen, pH, oxidation reduction potential, conductivity, and turbidity. In our analysis, we compared the water variables at two different sites as well as the difference between morning and afternoon. The findings suggest that with specific variables there will be a correlation between the organisms and also, the plant life that help the habitat remain intact. From the measurements that we obtained, we predicted that the water variables in the Puerto Viejo River are significantly different than the water variables in the creek.

Presented: Tower Day

Influence of Personality on Opinion Change in a Critical Thinking Class

Change in levels of paranormal belief (change scores) were assessed pre and post semester in a critical thinking class, Pseudopsychologies and the Paranormal. Personality, in terms of the dominant "Five Factor Model" was assessed via the NEO Pi-R Personality Inventory. Exploratory correlational analyses were conducted. No significant relationships between change scores and the scales of the NEO Pi-R were found. A number of specific questions from the NEO Pi-R scales of agreeableness (A5), conscientiousness (C2, C4), and openness (O1) were modestly correlated with change scores. A linear regression model was created to analyze which NEO Pi-R questions were strongest in predicting change in paranormal belief scores. Model 1 containing only item #20 "I am easy going and lackadaisical" from the NEO Pi-R accounted for 19% of the variance in change scores, and model 2 containing item #20 "I try to be humble," in addition, accounted for 25% of the variance in change scores. Though the model containing these two variables accounted for 45% of the variance in change scores, the meaning of this observation is open to interpretation and is speculative at best. Overall, strong support for the Five Factor Model as a moderating variable in change scores was not observed. There may, however, be other personality variables that have a stronger influence on opinion change.

Andrew Zimmerman

*Faculty Mentor:
Dr. Harvey Richman
Psychology*

Submission to *Abstracts 2015*

Undergraduates at Columbus State University who engage in research, critique and scholarship during the academic year of 2014-15 are invited to publish an abstract of their work in next year's annual. Abstracts from all disciplines which have been published or presented at local, regional, national or international conferences during the Summer 2014, Fall 2014, and Spring 2015 will be included.

Abstracts that are approved by faculty mentors may be submitted electronically at <http://honors.columbusstate.edu/abstracts.php>. Interested students are encouraged to visit the site to review the full list of information required when submitting their abstracts.

Cover Art

The idea for this image came to me when I was walking across campus one sunny day, and I observed a group playing Frisbee next to Columbus State University's iconic clock tower. Although Frisbee seems very simple, this game involves math, angles, trajectory, and momentum. As I began to sketch, I decided to imbue the drawing with a renaissance feel; I left the orthogonal lines in the drawing that I used for perspective to demonstrate the mechanics of sketching. I also intertwined the modern school logo into the more classical composition in order to demonstrate clearly that this is Columbus State University. I further abstracted the arrangement by including a larger view of the clock face demonstrating how important time is to the advancement of knowledge, which is possible in a University setting.

Julianna Wells
Art Major, Honors College



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